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The Financial Status of Medical Education

Inadequate financing is a threat to the nation's medical schools. Sufficient funds, free of outside control, must be provided if the schools are to continue their progress.

WARD DARLEY

ANY intelligent consideration of American medical education must be based upon an understanding of the manner in which our medical schools function and of the responsibilities which they carry. Briefly, these may be described as follows:

FIRST, the schools, along with the operation of classrooms and laboratories for students, are intimately concerned with rendering medical service and conducting medical research. These activities are essential components of their educational programs because they provide the functioning units about which students can associate and organize the knowledge and interests that evolve from their formal study. If these activities are to serve their purpose, they must make it possible for students to assume responsibility for the care of patients and to observe, often to take part in, the discovery and application of new knowledge.

SECOND, our medical schools must participate at all levels in physician education. These are: undergraduate education (the four years leading to the M. D. degree), which is required of all physicians and which is not offered by any institution except an approved school of medicine; internship and specialty training, which, while available in nonmedical school-associated institutions, have become an essential activity of our medical schools; and finally, postgraduate or continuing education (educational activity aimed at the physician in practice), which is steadily gaining in importance as a medical school's responsibility.

THIRD, the same educational, service and research personnel and facilities that are essential to the education of physicians also are necessary for the education and training of other health and medical personnel. Furthermore, to this added responsibility, the same resources are needed frequently in connection with the educational programs of still other student groups. Consequently, a medical school, in addition to being responsible for the education of

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undergraduate medical students, interns and specialty and postgraduate medical students, may find it necessary to assist with the education of biological and physical scientists, dentists, nurses, veterinarians, pharmacists, social workers, many categories of medical technicians, lawyers, clergymen, school teachers and a miscellaneous assortment of college students. The biological and physical scientists first mentioned in the above sentence are of particular importance. These individuals (usually Ph. D. or Sc. D. candidates—they may or may not have M. D. degrees) constitute the teachers and investigators in the scientific subjects and areas that are basic to clinical and applied medicine. The short supply in this type of personnel helps account for many faculty vacancies in our medical schools.[1]

All of this can be put another way. Physicians form the core of this nation's health and medical resources. Our medical schools are the indispensable producers of physicians. Physicians cannot carry their load of responsibility without competent teammates and helpers. It is in the interest of satisfactory health and medical service, then, that the education of the physician should take place, side by side, at least in part, with his teammates and helpers in the same environment in which the complete health team ultimately will function. This means that along with lecture rooms and class and research laboratories, a medical school must operate or be closely associated with hospitals and clinics, all of which are used in the training of many categories of health and medical service and research personnel in addition to the education of physicians.

If the medical schools are to discharge this broad spectrum of responsibility in an effective manner, they and their associated resources must receive adequate financial support. The rest of the present statement is an attempt to provide the basis for an understanding of the financial situation with which our medical schools are faced today.

Before getting into the details of this discussion, however, it is important to make one point. With the responsibilities and activities of our schools so varied, so extensive and so complicated, the difficulties of cost accounting are such that any comparison of costs between schools is of no significance. This is particularly true when attempts are made to compare the isolated costs involved in the education of any one category of students. Indeed, to isolate such costs usually is not possible. As a consequence, the medical school rather than any one category of activity or student will be made the focus of this statement. This should not seem unreasonable, for after all it is the medical school about which the broad function of medical education revolves. It is this total function that is important, not any isolated part of it!

Present Problems

With the passage of time, it is increasingly the opinion of all medical educators that the financial support of our medical schools is inadequate, particularly if the needs of this nation for health and medical service are to be met in a manner consistent with our expanding body of scientific knowledge and the demands of our people. Two sets of circumstances responsible for this situation can be pointed out.

The first derives from the simple fact of progress. Since 1920, phenom-

enal scientific advances have followed each other in rapid succession. It is necessary to mention but a few of the areas in which these advances have taken place: endocrinology, hematology, psychiatry, surgery, nutrition, radiology, cardiology, etc., to such recent developments as radioactive isotopes, the new antibiotics, a better understanding of the virus diseases and the management of water and electrolyte balance. As far as medical education is concerned, these advances have required complicated equipment, extensive facilities, and more and more broadly trained teachers. These advances also have demanded improved teaching, the culmination of which has been reached in the full-time faculty, the teaching hospital with its clinics and laboratories and the requirement that students assume responsibility for the care of patients and participate in the performance of research. These facts help to explain the 500 per cent increase in the cost of medical education that has taken place during the past 30 years.[2]

Progress has always been, and one can confidently say always will be, something to be reckoned with in educational effectiveness. In a field as important as medicine, it is essential to keep the gap between what is known and what is taught as narrow as possible. Inadequate financing of the medical schools is contributing to the unnecessary widening of this gap. This should be corrected.

In 1947-48, information submitted by the medical schools to the Surgeon General's Committee (PHS) on Medical School Grants and Finances indicated that the most significant unmet needs of their educational programs existed in those areas in which the greatest strides into the unknown were currently taking place. The expression of these inadequacies in terms of the annual financing needed for their correction was estimated as approximating $30 million.[3] The report of the committee did not define clearly just what these needs were, but in the opinion of the Executive Council of the Association of American Medical Colleges, the most important areas involved are psychiatry, public health, preventive medicine, rehabilitation, industrial medicine and such sciences basic to medicine as biophysics, biochemistry, physiology and microbiology.

The Association of American Medical Colleges currently is making a survey to reappraise this situation. So far 54 schools have been heard from. Although some improvement is in evidence, the same general financial problem persists. The schools' present inadequacies still include the areas that just have been enumerated. When these are again translated into the annual amounts needed for their correction, an average of approximately $250,000 per school is found. If this figure holds as the average for all schools, the total needed will stand at approximately $20 million.[4*]

The last Educational Number of the *Journal* of the American Medical Association points out that in 1952-53, the medical schools of this country will receive $45 million more for their instructional programs than was the case in 1947-48.[5**] With this increase in sight, one might well wonder why

*This figure and the $30 million obtained by the PHS survey in 1947-48 (end of preceding paragraph) cannot be taken as absolutely comparable. They were gathered and compiled by different individuals in different ways. In the opinion of the Council, however, the general situation which they depict can be accepted as valid.

**The figure of the Public Health Service survey of 1947-48 and the one obtained by the American Medical Association of 1952-53 cannot be taken as absolutely comparable. They were gathered and compiled by different individuals in different ways. However, insofar as they indicate a substantial increase in income over the

the inadequacies so apparent in 1947-48 still interfere with the effectiveness of the medical schools. The answers are easy. In five short years the wheels of progress have ground out advances in cardiac diagnosis and surgery, radioactive isotopes and the adrenal hormones. Any medical school adjusting its physical plant, equipment and personnel to these advances will find itself adding many thousands of dollars to its capital expenditures and annual operations.

To progress must be added the second set of circumstances which explain the present financial difficulties of medical schools and account for the paradoxical situation in which the addition of $45 million to medical school income has not obliterated the problem as it existed five years ago. The explanation has to do with our changing economy.

Before enlarging upon economic trends as a factor in the current under-financing of medical education, it is important to realize that there are two types of medical schools: those sponsored by state and city governments and those sponsored by privately incorporated universities or that in themselves represent private corporations. It also is important to remember that the income for all medical schools can be classed as coming from student tuition and fees, gifts and grants, interest from endowments, transfers from general university funds and appropriations from state or city governments. In general, the publicly supported institutions derive the largest share of their income from tax appropriations, while those that are privately supported depend mostly upon gifts, grants and interest from endowment.

Since 1939 inflation has resulted in doubling the cost of living. The lowering purchasing power of the dollar, of course, has had an equal effect upon the financing of all medical schools. Other economic factors have had a more selective effect upon each type of school.

In the case of the publicly supported schools (a few schools could not be tabulated), while income from tuition, gifts, grants and endowment is important, city or state tax funds constitute the major support. During recent years, however, significant shifts in the relative importance of these several sources of income have taken place. Between 1940-41 and 1947-48 the gross income from tuition increased slightly, that from gifts, grants and endowments decreased slightly, while that from appropriations increased markedly. Percentagewise, all sources of income decreased, except that from appropriations, which increased over the seven-year period from 50 to 76 per cent (see Figure 6).[3]

The situation for the privately supported institutions (a few schools could not be tabulated) is decidedly and alarmingly different. In 1940 tuition and fees, grants and gifts and income from endowment constituted the main sources of income. The shift in the relation of these income sources over the next eight-year period is of significance in that while all revealed a considerable gross increase, each, except for transfers from university general funds, decreased precipitously as far as its percentage proportion of total income was concerned. It is of particular significance that in 1941 about 35 per cent of the income came from endowment

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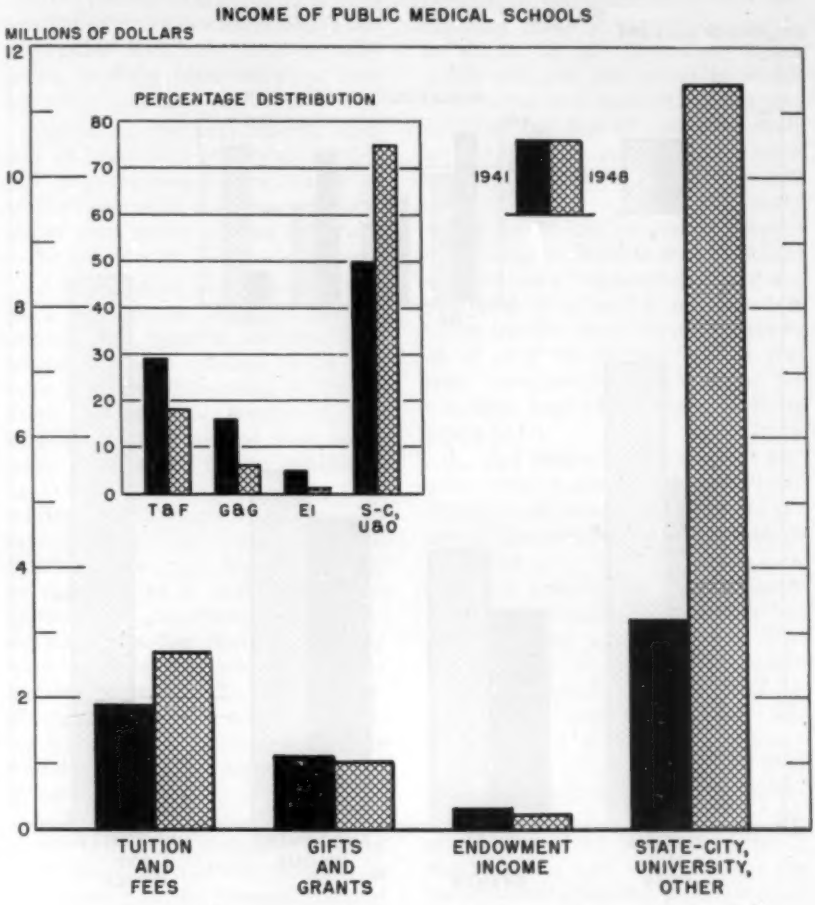
five-year period, their use can be considered as valid. Furthermore, it must be remembered that the substantial increase in income that has taken place has not affected all schools equally. The increases for some have been substantial, for others minimal. Obviously this makes for marked differences in effectiveness among many schools.

FIGURE 6. Income for Basic Operations by Source of Income, Public Medical Schools, 1941 and 1948

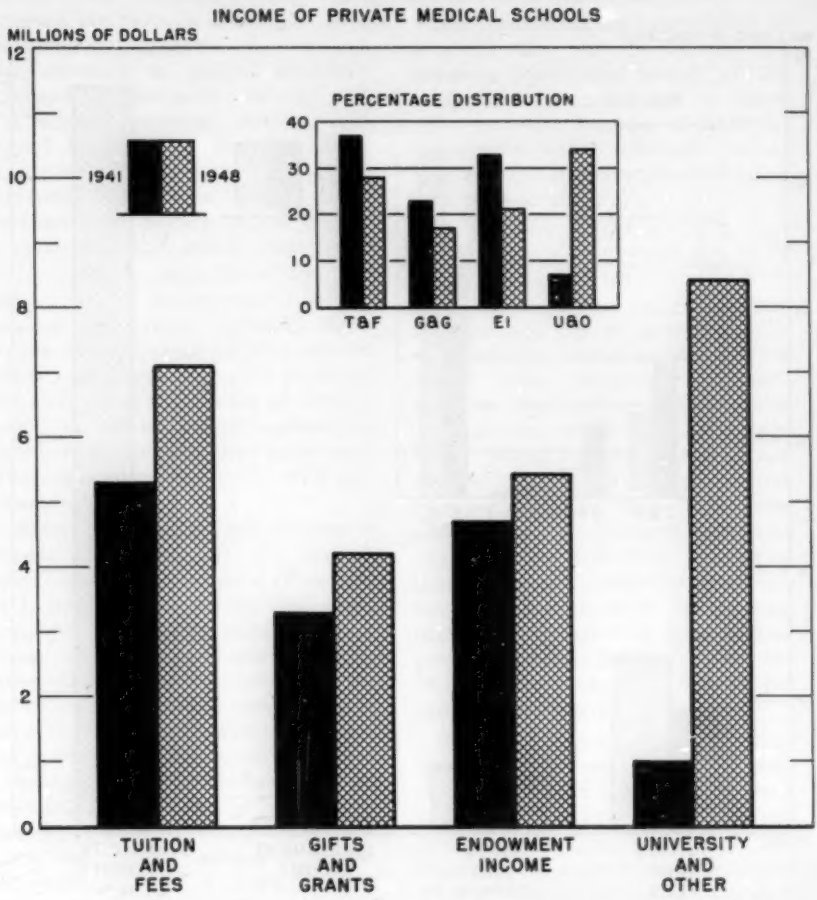
(PHS Figure)



interest. By 1948 this dropped to a little over 20 per cent—this in spite of an increase of 21 per cent in endowment capital. Another point to note is the increase in the relative importance of transfers from university general funds. In 1941, income from this source was of no particular moment, but it is apparent that by 1948 the decreases just noted were largely being made up by such transfers—an approximate gross increase of from one to eight and one-half million dollars and a percentage increase from 7 to 34 (see Figure 7).[5] This situation is creating serious financial problems for many universities.[6]

In summary, what this means is

FIGURE 7. Income for Basic Operations by Source of Income, Private Medical Schools, 1941 and 1948
(PHS Figure)



that the publicly supported schools must depend more and more upon the appropriation of public funds. As for the privately supported schools, present trends are such that as income from tuition, gifts, grants and endowment decreases, their only alternative is to continue to ask their parent universities for larger and larger support from general funds.

The final section of the present statement deals with possible ways and means of alleviating the pressing financial problems of the medical schools.

Economy always must be considered as a means of relieving any type of financial pressure. It should be remembered that most of our medical schools have been practicing rigid

economy for many years. In fact, it has been the need for rigid economy that has prevented many schools from developing much needed teaching opportunities and new training programs. In many cases there has been too much economy already.

Aside from economy, the only other way of improving any financial picture is to increase income. As far as medical education is concerned, there are at least seven sources of income to be considered:

1. The medical schools might realize a net income from the sale of medical and hospital services. Few schools are in a position to do this even if it were desirable to do so. From the practical standpoint, the medical practice laws of most states make it unlawful for an institution to charge for medical or surgical service. Furthermore, any hospital superintendent or hospital board member knows that hospitals cannot be operated at a profit. From the philosophical standpoint, most medical educators feel that the primary business of medical schools is teaching and research. To direct their efforts in a way that means conducting a competitive business enterprise would detract from these main objectives.

2. The medical schools could improve their financial structure if they could be relieved of the necessity of contributing to the financial support of teaching hospitals and clinics. The functional overlap between medical teaching and medical service creates financial problems for many medical schools and also for their teaching hospitals. The financing of both could be considerably improved if the communities which benefit so greatly therefrom would provide more completely for the service phase of the medical schools' responsibility, particularly for the indigent patient load which is so importantly involved. Difficulties concerned with cost accounting make it almost impossible to arrive at an acceptable figure which indicates the extent to which universities and medical schools underwrite the cost of operating their service facilities, but in the aggregate these expenditures amount to millions of dollars a year. The study conducted by the Surgeon General's Committee on Medical School Grants and Finances indicated that for the year 1947-48 at least $3 million additional income would have accrued to 46 of over 79 medical schools had their communities provided for the complete support of their teaching hospitals.[3]

3. The medical schools could improve their financial position greatly if they could more nearly recover the actual costs involved in their research programs.

To this point in the present statement the financing of research has received little attention. This must not be taken to mean that research is an unimportant medical school responsibility—quite the contrary. Research is just as important a frame of reference for an educational program as is medical service. An understanding and an appreciation of the manner in which new knowledge is discovered is just as vital as is the understanding and the appreciation of the manner of its application. If education for medicine is to be of maximal effectiveness, the student's interest in research must be just as real as is his interest in service.

World War II and the struggles that are following in its wake are emphasizing the indispensable part that research must play if we are to survive as a nation. As a consequence, research has rapidly assumed a place

of first importance as a responsibility of our medical schools. Research programs are essential not only because of the new knowledge they provide, but also because they are necessary for the education of tomorrow's physicians and medical scientists who will make this new knowledge available to society.

Between the years 1940 and 1953 the funds for research that will accrue to our medical schools will have increased from $3,500,000[3] to over $33 million.[5]* This phenomenal growth of research, important as it is, is complicating the financing of our schools of medicine in unexpected ways. Basically, this situation stems from the fact that research grants fall far short of meeting the total cost involved. The difference must be met by the medical schools. Difficulties concerned with cost accounting here again make it well nigh impossible to determine the exact extent to which school finances are obligated, but it is certain that in the aggregate the amount reaches many millions of dollars a year. If granting agencies would more nearly compensate medical schools for the total cost of research, the financial relief would be significant.

Before leaving this important question, another problem arising from the grant method of supporting research deserves discussion. Most money for research comes to a school of medicine in the form of grants for specific projects. Most such grants are made on a year-to-year basis; they may be discontinued at any time. As a consequence, most of the scientific personnel required must be employed for a limited but unspecified period of time. Thus their security is inadequate. The best workers are not attracted under such conditions. If a school attempts to meet this situation by guaranteeing permanent employment or academic tenure, the resultant gamble that the necessary funds will materialize stands as an obvious threat to the long-range solvency of the institution. Its other responsibilities are put in jeopardy. And yet the additional faculty which the system of research grants has made possible is a factor in increasing the teaching effectiveness of our schools. If anything were to happen to cause the schools to lose the services of these teacher-research workers, the result upon teaching and research would be serious in most instances.

4. The medical schools might improve their financial structure somewhat by increasing tuition charges.

Any individual planning his finances for the study of medicine must take three things into account: the costs of living, the number of years involved, and tuition and fees.

The problems peculiar to living costs are self-evident and require no elaboration.

The time involved in completing the formal part of medical education deserves discussion. The minimum is eight years: three years of college, four years of medical school and one year of internship. The time has come, however, when this minimum of eight years is not adequate. As a consequence, most physicians, on the completion of their internships, must prepare for one of the specialties or take additional training for general practice. This requires an additional training period of from two to five years and poses a significant financial

*Again these two sets of figures were gathered and compiled by different people in different ways. Therefore, they cannot be taken as indicating absolute comparison. They are sufficiently valid, however, to indicate that a substantial increase in the funds available for research has taken place.

problem that must be met by the young physician.

Tuition represents cash outlay that must be met at regular intervals during the four years in medical school, and its payment stands out as a very real item of expense for the student. The average student fee for the current academic year for all medical schools is $623—an increase of 165 per cent of the average fee paid in 1939.[5]

Because increases in tuition already are calling for corresponding increases in money for scholarships, often from general funds, practically all medical educators feel that tuition as a source of added income for medical schools has reached the point of diminishing returns.

Finally, and significantly, it should be pointed out that high fees combined with many years of low or no income and high living costs have been discouraging many well-qualified students from attempting to enter the profession of medicine. Our nation can ill afford to let such a situation continue.

5. Medical schools might improve their financial structure by obtaining larger appropriations from city and state governments. Tax-supported institutions already have been receiving significant increases from this source; such increases will undoubtedly continue. It must be remembered, however, that a rubberband can stretch only so far before breaking. With federal and earmarked taxes interfering more and more with the general financing of many of our states and cities, the question of how much further many communities can go in supporting their medical schools is becoming a source of serious concern. A few privately sponsored medical schools obtain a little of their support from city or state tax funds. An extension of this practice is something worth considering.

6. Medical schools might improve their financial structure by obtaining more and larger gifts, grants and endowments.

This type of income has been of particular importance in the support of privately operated institutions. The manner in which relative income from this source has been diminishing during the past few years has been mentioned.

An additional point needs to be made. Many gifts, grants and endowment funds are given to schools of medicine with the stipulation that they be used for specific purposes. In the year 1947-48, half of the endowment funds of 64 medical schools were so restricted.[3] While income restricted to a specific purpose frequently may fit into a school's programs and thus be satisfactory, there are many instances when such is not the case. Donors making gifts to schools of medicine should be made to realize this. It is the free and fluid funds of a medical school that serve it best. The recent activities of the National Fund for Medical Education and of the American Medical Education Foundation in raising funds for medical schools are of significance, not only in that they represent an effort to interest the general public in contributing to the support of medical education, but also in that these funds are fluid. The schools may use them in any way to strengthen their instructional programs.

7. The financial structure of medical schools might be improved by subsidy from the federal government.

Help from the federal government has been given serious consideration as a means of adding to the support of our medical schools.

While university and medical school authorities are by no means in agreement regarding federal aid as a matter of principle, it is safe to say this: if federal aid should materialize, it must be set up so as to provide sufficient funds upon a continuing basis, free of control, so that each school can maintain a hard core of security for its essential teaching, research and service programs.

It is not the purpose of the present statement to discuss arguments for or against the principle of federal aid. The idea is mentioned here only to complete the survey of possible ways and means of improving the financing of medical education.

Before closing, it is most important to point out that failure to give detailed consideration to the question of the expansion of our medical schools or to the addition of new ones has been deliberate. Before such steps are given broad or intense consideration, all medical educators feel that the basic structures of the existing schools and their educational programs must be properly strengthened through more adequate financing. This omission is not a failure to recognize the need for expanded and new facilities. As evidence of such realization, it may be pointed out that, in spite of great financial vicissitudes, enrollment of freshmen in the medical schools of the country has been increased during the past 10 years by over a thousand.[5] This increase is equivalent to the first-year classes of 10 average-sized medical schools. This figure includes three new schools that have been approved since 1942. Many medical educators believe that if adequate funds for all our medical schools were available, continuing increases in their enrollments, consistent with high-quality education, will rapidly catch up with the need.

The chief purposes of the present report have been: (1) to provide a general statement of the place medical schools must fill in the broad setting of medical education as an important function of our society; (2) to point out that inadequate financing is now preventing the medical schools from realizing the potential of which they are capable; (3) to explain the principal reasons for present financial difficulties; (4) to outline possible ways and means to strengthen our medical schools financially.

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The Study of Applicants

For Admission to United States Medical Colleges, Class Entering in 1952-1953

A three-year trend shows the number of students applying to medical schools is decreasing steadily. The current study indicates that even among schools having a large number of applicants, competition for the able students has increased.

JOHN M. STALNAKER

THE DECREASE in the number of students applying to medical school continues while the size of the freshman class in medical school is increasing. Table 1 shows that applicants for the 1952-53 freshman class number some 3,157 fewer than a year ago, and over 7,600 fewer than three years ago.

Because the average applicant applied to three or four medical schools, there are more applications filed than there are students applying. In the year under report, there were 56,319 applications made, a drop of about 32,000 from three years ago and over 14,000 less than one year ago.

Of the 16,763 applicants for the 1952-53 freshman class, 5,215 are reapplying after having attempted to gain admission a year ago. About 38 per cent of this repeating group gained an acceptance, while 50 per cent of the group applying for the first time were accepted.

Mr. Stalnaker is director of studies of the Association of American Medical Colleges.

These figures, however, do not reflect the variation among the schools. Some medical schools had a wealth of good applicants while other schools which limit their applicants to geographical boundaries had to scrape the bottom of the barrel to secure a freshman class. Even with the schools having what appear to be a large number of applicants, competition for the able students has increased.

The basic source data for this study of applicants have been supplied by the medical schools and compiled by the central office of the Association. The accuracy of the statistics and their completeness are dependent upon the accuracy and completeness of the reporting done by the schools.

Each medical school sends to the

TABLE 1.

A Comparison of the Number of Applicants for the Past Six Years

Freshman Year	Number of Applications	Number of Individuals	Applications per Individual
1947-48	56,279	18,829	3.0
1948-49	81,662	24,242	3.4
1949-50	88,244	24,434	3.6
1950-51	81,931	22,279	3.7
1951-52	70,678	19,920	3.5
1952-53	56,319	16,763	3.4

TABLE 2. Number of Completed Applications Acted Upon by Each Medical School

Medical School	Size of Freshman Class	Total Number of Applications Reported		
		Men	Women	Total
Alabama	80	239	17	256
Albany	50	907	39	946
Arkansas	90	184	8	192
Baylor	94	490	27	517
Boston	72	1022	70	1092
Bowman Gray	52	721	22	743
Buffalo	70	719	36	755
California, L.A.	32	419	37	456
California, S.F.	76	422	42	464
Chicago Medical	72	1187	38	1225
Chicago, U. of	72	772	44	816
Cincinnati	90	965	29	994
Colorado	79	159	12	171
Columbia	120	1261	138	1399
Cornell	86	1208	118	1326
Creighton	76	883	23	906
Dartmouth	24	443	1	444
Duke	76	626	29	655
Emory	72	455	18	473
Georgetown	124	1173	35	1208
George Washington	100	1167	60	1227
Georgia	80	169	6	175
Hahnemann	105	1352	64	1416
Harvard	114	1194	81	1275
Howard	75	450	48	498
Illinois	166	517	27	544
Indiana	150	437	23	460
Iowa	120	156	7	163
Jefferson	170	2077	...	2077
Johns Hopkins	75	430	44	474
Kansas	120	241	9	250
Louisiana	125	299	19	318
Louisville	100	227	13	240
Loyola	88	635	21	656
Marquette	100	939	40	979
Maryland	104	314	16	330
Med. Evangelists	96	283	24	307
Meharry	65	90	2	92
Miami	28	167	9	176
Michigan	200	485	41	526
Minnesota	130	298	15	313
Mississippi	56	137	3	140
Missouri	44	135	4	139
Nebraska	85	194	11	205
New York Medical	128	2388	140	2528
New York U.	140	1522	99	1621
North Carolina	60	203	7	210
North Dakota	40	71	2	73
Northwestern	128	1459	73	1532
Ohio	150	391	23	414
Oklahoma	100	193	7	200
Oregon	75	286	17	303
Pennsylvania	125	1768	129	1897
Pittsburgh	100	574	42	616
Rochester	71	1117	80	1197
St. Louis	125	1158	40	1198
South Carolina	80	128	7	135
South Dakota	32	171	6	177
Southern California	69	584	47	631
Southwestern	101	307	19	326
Stanford	62	513	41	554
State U. of N.Y. (N.Y.)	150	1297	88	1385
State U. of N.Y. (Syracuse)	76	1529	73	1602
Temple	135	2028	106	2134
Tennessee	200	389	20	409
Texas	162	365	18	383
Tufts	115	518	26	544
Tulane	130	1087	42	1129
Utah	55	380	10	390
Vanderbilt	52	746	29	775
Vermont	50	164	6	170
Virginia, U. of	76	594	27	621
Virginia, Med. Col. of	84	288	19	307
Washington, U. of	75	266	17	283
Washington (St. Louis)	86	1478	51	1529
Wayne	70	312	21	333
Western Reserve	80	1336	84	1420
West Virginia	31	113	4	117
Wisconsin	80	186	21	207
Woman's Medical	50	3	198	201
Yale	80	692	58	750
TOTAL	7426	53252	3067	56319

Association office, as it has for many years, an individual report for each person who presents a completed application, or a completed preliminary application if the school uses the two-step system of application. This year 56,319 such reports were received. These reports constitute the basic data on which the tables which appear in this report are based.

Thanks are due to the staffs of the medical schools who prepare the original reports and do the necessary checking. Without their cooperation such a study would be impossible. Without their friendly assistance the work would have been more arduous.

The 81 medical schools which are admitting freshmen take action on the applications over a long period of time. A student applying to two medical schools in early September and having his applications complete and in order at both institutions might have a decision from one of the medical schools by the middle of Septem-

ber or earlier, and from the other not until the middle of the following July, some 10 months later. The competition for the abler students is causing more and more medical schools to make their admissions at an early date. The Committee on Student Personnel Practices of the Association is studying the influence on the student of this long period of acceptance. It has already recommended that deposits not be required from the students before January 2, but not all schools are following this recommendation.

Table 2 gives the number of men and women applicants reported by each medical school. The size of the freshman class is also indicated. This table, as is true with most statistical tables, must be interpreted with reference to the background conditions. Without detailed information about how each school defines an applicant and other conditions of admission requirements, comparisons among schools are apt to be misleading. Also, it must be appreciated that certain groups of students make application to the same several medical schools.

To take one particular case, one popular medical school, School A, having a large number of applicants, had 44 per cent of its applicant group apply to another specific medical school (B), and 40 per cent to still another one (C). It is obviously erroneous for each of the three medical schools, A, B and C, to believe that all of their applicants will accept appointment if it is offered to them. If the applications received by the three medical schools total 3,000, one must recognize that perhaps only 1,200 different individual applicants are involved, not 3,000, and that these 1,200 also have applied to other medical schools.

It is clear from Table 2 that medical schools restricting their applicants by residence requirements have smaller groups from which to select their classes. A study of the average score on the Medical College Admission Test for the applicants to each college, not reported here, also shows the schools with geographic restric-

TABLE 3. Applicants Classified by Number of Applications Made and Action Taken

Number of Applications Made	One or More Acceptances			No Acceptances			Total		
	Men	Women	Total	Men	Women	Total	Men	Women	Total
1	2633	174	2807	3806	283	4089	6439	457	6896
2	1265	64	1329	1266	98	1364	2531	162	2693
3	973	56	1029	814	67	881	1787	123	1910
4	673	57	730	641	34	675	1314	91	1405
5	497	30	527	425	19	444	922	49	971
6	306	17	323	301	23	324	607	40	647
7	230	16	246	232	13	245	462	29	491
8	166	3	169	191	7	198	357	10	367
9	153	6	159	170	6	176	323	12	335
10-14	309	15	324	393	19	412	702	34	736
15-19	83	2	85	101	7	108	184	9	193
20-24	31	2	33	47	1	48	78	3	81
25-29	10	..	10	12	1	13	22	1	23
30-34	3	..	3	5	..	5	8	..	8
35-45	3	1	4	3	..	3	6	1	7
TOTAL	7335	443	7778	8407	578	8985	15742	1021	16763

tions are not attracting as high scoring a group as are those medical schools with no restrictions. Indeed, at this time some medical schools are admitting students who have academic records which barely meet the minimum requirements, and whose test scores are in the lowest quarter of the applicant group (and in some cases in the lowest 10 per cent).

Of the 56,319 applications (not individuals) made, 9,833 were accepted, or approximately 17 per cent as contrasted with 14 per cent last year. Because all medical schools are notified of the accepted applicants reported to the central office, some medical schools remove such applicants from further consideration, and thus reduce the number of their accepted applications. However, there were 1,596 individuals who received two or more acceptances. Actually, this group received a total of 3,651 acceptances.

Table 3 classifies the applicants by the number of applications they made. Each entry in the table represents an individual. The total of individuals who made applications is 16,763, and 46 per cent were accepted by one or more medical schools.

Although the average student applied to 3.4 medical schools, 41 per cent of the total number of applicants made application to one medical school only, and 41 per cent of this group was accepted. About two-thirds of the applicants applied to one, two or three schools. At the other extreme, seven students applied to more than 35 schools each, and four of them were accepted! These seven students made 278 applications. One man from New England applied to 45 medical schools and gained one acceptance from a state medical school far from his home state. A west coast resident made 44 applications and was accepted by an east coast state school. One New Jersey girl applied to 40 schools and received three acceptances.

Of the group making a single application, 41 per cent gained acceptance. Among those making two applications, 49 per cent were accepted and in the group making three ap-

TABLE 4. Mean Scores on the Medical College Admission Test for Applicants Making Various Numbers of Applications

Number of Applications	Group Receiving One or More Acceptances				Group Not Accepted by Any School			
	Verbal	Quant.	Mod. Soc.	Science	Verbal	Quant.	Mod. Soc.	Science
1	511	522	509	513	463	459	462	451
2	519	527	516	524	460	455	462	452
3	528	531	523	532	461	452	463	451
4	526	527	518	530	467	460	466	462
5	525	530	525	529	464	462	472	461
6	525	527	527	532	474	462	474	459
7	530	518	518	528	475	465	478	465
8	521	523	530	533	465	456	472	467
9	541	520	533	540	484	476	495	471
10-14	546	536	550	549	485	472	491	481
15-19	543	521	557	547	485	467	492	478
20-24	538	561	554	555	493	477	500	479
25-29	563	498	586	529	449	453	477	473
30-34	468	528	505	532	485	509	515	461
35-45	600	557	575	575	465	435	482	482
TOTAL	522	526	519	525	465	459	467	457

TABLE 5. Applicants Who Also Applied Last Year Classified by Number of Applications Made and Action Taken

Number of Applications Made	One or More Acceptances			No Acceptances			Total		
	Men	Women	Total	Men	Women	Total	Men	Women	Total
1	619	42	661	1333	92	1425	1952	134	2086
2	312	10	322	486	28	514	798	38	836
3	234	11	245	299	23	322	533	34	567
4	160	11	171	210	8	218	370	19	389
5	121	4	125	156	2	158	277	6	283
6	87	2	89	106	5	111	193	7	200
7	65	5	70	84	5	89	149	10	159
8	70	2	72	68	2	70	138	4	142
9	61	1	62	69	4	73	130	5	135
10-14	130	3	133	141	7	148	271	10	281
15-19	33	..	33	48	4	52	81	4	85
20-24	15	1	16	21	..	21	36	1	37
25-29	3	..	3	4	..	4	7	..	7
30-34	2	..	2	3	..	3	5	..	5
35-41	2	..	2	1	..	1	3	..	3
TOTAL	1914	92	2006	3029	180	3209	4943	272	5215

plications 54 per cent were accepted. For the total group, 46 per cent were accepted.

Most of the applicants have taken the Medical College Admission Test. This test has four sections: verbal, quantitative, understanding modern society and science. Scores were available for 14,744 (about 88 per cent) of the students reported in Table 3. Mean or average scores were computed for each entry in Table 3 and these are given in Table 4. The accepted group average 522, a score at the 59th percentile, while the group not accepted scored at the 36th percentile on the verbal section of the test. The mean score for the accepted group making three applications each is greater than for the accepted group making a single application.

Again this year, a special study has

TABLE 6. Mean Scores on the Medical College Admission Test of Applicants Who Also Applied Last Year

Number of Applications Made	One or More Acceptances				No Acceptances			
	Verbal	Quant.	Mod. Soc.	Science	Verbal	Quant.	Mod. Soc.	Science
1	493	495	490	495	463	454	463	454
2	494	499	495	507	457	450	463	452
3	507	510	508	517	465	449	467	454
4	508	511	504	520	462	451	459	458
5	518	521	515	528	474	465	485	473
6	513	503	517	516	464	450	473	455
7	517	510	496	518	451	457	471	465
8	493	507	497	516	463	454	476	464
9	518	521	525	545	502	484	509	478
10-14	531	520	535	539	473	473	487	487
15-19	534	513	549	543	479	460	489	481
20-24	527	556	560	582	479	488	487	495
25-29	558	458	618	542	427	465	520	487
30-34	455	595	530	575	475	482	515	485
35-41	575	515	575	565	535	475	575	535
TOTAL	504	505	504	513	464	455	468	459

TABLE 7. Number of Individuals Accepted Classified by the Number of Medical Schools Offering Them an Acceptance

Number of Acceptances	Also Applied Last Year			Others			Total		
	Men	Women	Total	Men	Women	Total	Men	Women	Total
1	1569	81	1650	4245	287	4532	5814	368	6182
2	266	11	277	918	47	965	1184	58	1242
3	59	..	59	204	14	218	263	14	277
4	14	..	14	41	2	43	55	2	57
5	5	..	5	10	1	11	15	1	16
6	1	..	1	1	..	1	2	..	2
7									
8	...	..	...	2	..	2	2	..	2
TOTAL	1914	92	2006	5421	351	5772	7335	443	7778

been made of the group reapplying after having failed to gain admission last year. The figures are given in Table 5. This group contains students who took a "flyer" and were encouraged to take one more year of preprofessional training, and also some students who were found unfit last year but continue to hope for admission. Slightly less than a third of the total applicant group is made up of these repeaters. As might be expected, a smaller proportion of the repeater group is admitted — about 38 per cent compared to 50 per cent of the new group. The repeating group makes more applications on the average.

Table 6 gives the mean scores on the MCAT for the group given in Table 5. In the main their scores are lower than for the group applying for the first time but, of course, the repeating group contains many able applicants. It also contains some dead wood.

Table 7 presents information on the accepted group and Table 8 gives the mean scores on this group. Most of the accepted group receive a single acceptance, but the group receiving two acceptances scores higher on the MCAT. Indeed, the scores increase with the number of acceptances except for the two students who received six acceptances, and there the number is too small to be significant.

The final table divides the appli-

TABLE 8. Scores on Medical College Admission Test of Applicants Receiving the Number of Acceptances Indicated

Number of Acceptances	Number of Applicants*	Mean Score on the Medical College Admission Test			
		Verbal	Quant.	Mod. Soc.	Science
1	5771	514	519	513	516
2	1223	542	546	535	547
3	275	568	573	555	575
4	57	579	567	581	588
5	16	576	588	557	616
6	2	530	510	540	560
7	...	...	...	...	...
8	2	655	660	680	655
TOTAL	7346	521	526	519	525

*Number for whom test data were available.

TABLE 9. Number of Individuals from Each State Applying to One or More Medical Schools

State	Accepted			Not Accepted			Total		
	Men	Women	Total	Men	Women	Total	Men	Women	Total
Alabama	128	9	137	156	8	164	284	17	301
Arizona	25	0	25	28	0	28	53	0	53
Arkansas	107	7	114	83	3	86	190	10	200
California	367	31	398	625	61	686	992	92	1084
Colorado	78	4	82	70	5	75	148	9	157
Connecticut	91	3	94	198	7	205	289	10	299
Delaware	14	1	15	21	2	23	35	3	38
District of Columbia	45	2	47	96	10	106	141	12	153
Florida	125	6	131	186	6	192	311	12	323
Georgia	152	8	160	85	4	89	237	12	249
Idaho	30	0	30	24	0	24	54	0	54
Illinois	347	19	366	409	25	434	756	44	800
Indiana	182	6	188	132	6	138	314	12	326
Iowa	134	7	141	46	3	49	180	10	190
Kansas	117	2	119	99	6	105	216	8	224
Kentucky	117	6	123	84	6	90	201	12	213
Louisiana	154	9	163	64	4	68	218	13	231
Maine	19	2	21	26	2	28	45	4	49
Maryland	106	8	114	95	7	102	201	15	216
Massachusetts	208	11	219	278	19	297	486	30	516
Michigan	296	24	320	228	14	242	524	38	562
Minnesota	162	6	168	94	7	101	256	13	269
Mississippi	110	5	115	94	1	95	204	6	210
Missouri	126	3	129	113	3	116	239	6	245
Montana	22	0	22	27	3	30	49	3	52
Nebraska	113	7	120	98	6	104	211	13	224
Nevada	2	0	2	4	0	4	6	0	6
New Hampshire	18	1	19	15	0	15	33	1	34
New Jersey	264	13	277	446	28	474	710	41	751
New Mexico	13	2	15	9	1	10	22	3	25
New York	933	67	1000	1596	119	1715	2529	186	2715
North Carolina	144	9	153	134	7	141	278	16	294
North Dakota	46	0	46	17	1	18	63	1	64
Ohio	395	17	412	375	28	403	770	45	815
Oklahoma	117	1	118	88	7	95	205	8	213
Oregon	66	5	71	68	4	72	134	9	143
Pennsylvania	548	51	599	868	54	922	1416	105	1521
Rhode Island	38	1	39	58	3	61	96	4	100
South Carolina	100	4	104	46	6	52	146	10	156
South Dakota	40	3	43	17	0	17	57	3	60
Tennessee	179	11	190	75	4	79	254	15	269
Texas	364	26	390	207	16	223	571	42	613
Utah	63	0	63	50	2	52	113	2	115
Vermont	18	2	20	13	0	13	31	2	33
Virginia	149	5	154	104	12	116	253	17	270
Washington	108	5	113	129	10	139	237	15	252
West Virginia	66	3	69	93	8	101	159	11	170
Wisconsin	153	17	170	108	7	115	261	24	285
Wyoming	15	0	15	14	0	14	29	0	29
Canada	6	3	9	58	4	62	64	7	71
U.S. Possessions	38	1	39	119	17	136	157	18	175
Foreign	62	10	72	167	17	184	229	27	256
Not Stated	15	0	15	70	5	75	85	5	90
TOTAL Number of Individuals	7335	443	7778	8407	578	8985	15742	1021	16763

cants according to the state of residence and also according to the number accepted from each state. As usual, almost half of the applicants came from seven states. These states are, in order of the number of appli-

cants: New York, Pennsylvania, California, Ohio, Illinois, New Jersey and Texas. Of the applicants from New York (which were 16 per cent of all applicants) about 39 per cent were accepted while 64 per cent of the Texas applicants were accepted. The three Texas medical schools have places for 357 freshmen and 390 Texas residents were accepted by all medical schools. New York State has nine medical schools admitting 891 freshmen, and 1,000 New York residents were accepted by all medical schools in the country. New Jersey, on the other hand, a state of large population and relative high per capita income, which gives no support to medical education either through a state supported or privately supported medical school, had some 751 applicants of whom 277 or 37 per cent were accepted.

The type of study reported by Harold Davenport in the September 1952 issue of the Journal of MEDICAL EDUCATION, giving the ratio of applicants to population by states, will be reported later.

Salaries and Inflation

"THE AVERAGE PRACTITIONER has no appreciation of the plight of the medical schools in maintaining an adequate teaching staff. The obvious reason is that salaries are so inadequate in these inflationary times that even the man who might like to engage in a scientific career is forced into practice so that he may support his family. These circumstances have reached such a serious state that in the preclinical fields the usual instructional pyramids are upside down. Flexner found in 1949 that there were in our medical schools 139 professors of anatomy, 102 associate professors, 87 assistant professors and only 20 instructors of anatomy. The payment of better salaries to teachers in medical schools, and an increase in their numbers must go hand in hand with any proposal which may be made to increase the number of doctors." From an editorial in the December 1951 issue of the *Journal of the Tennessee State Medical Association.*

The Teaching of Physiology in Medical Schools

THE FOLLOWING ARTICLES represent a symposium dealing with the general problems of teaching physiology throughout the four years of medical school. They were prepared for a Symposium on Teaching sponsored by the Council of the American Physiological Society at their annual meeting.

The first two papers deal particularly with points of view in the teaching of the first course in physiology in the medical school; the third paper deals with the teaching of clinical physiology in the medical school; the fourth paper deals with the student point of view toward the teaching of physiology; and the fifth paper is an attempt to evaluate what practicing physicians think of their instruction in physiology in the medical school.

Are There Principles in Teaching Physiology?

E. F. ADOLPH

MANY OF US spend half our working lives in teaching but rarely think seriously about our guiding rules or our ideals. Anyone who is not an automaton tries to formulate working principles. But the principles are largely individual; few of them hold for a majority of teacher-and-student relationships. While no validated principles are known, a few unestablished principles are suggested here:

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1. *Teaching is a personal activity.* Every teacher invents ways of teaching, just as every student invents ways of learning. A fallacy of pedagogy is that it claims to tell others how to teach. All of us can profit by suggestions, but most of our impressive suggestions come from experience.

The core of teaching might be considered to be: (a) establishment of rapport with students, utilizing feedbacks of student reaction to guide our efforts at the moment and in future planning, and (b) arousing the stud-

ent's curiosity by challenging him enough to produce a constructive response.

Much teaching is impersonal. This is the automatic kind—a man with voice and lantern slides duplicates what a textbook or record player can do better.

You have heard the dream of the professor—that he was lecturing to his class. He awoke from his dream and found that he was, indeed, lecturing to his class! A student told me of another professor who gave the same lecture three times to the same class in one week, and was not aware he had repeated. Each lectured with almost nothing more rostral than his cerebellum.

Education is drawing out or leading out the student. A discussion group or a laboratory project puts the student into action and allows optimal opportunities for teaching. The professor analyzes a laboratory problem with the student. This means having the experienced teacher in the laboratory. Let the assistants "organize" the work, but let the professors point out lessons of the inadequate stimulus to nerve or an atypical response in muscle. The trials and errors are the meat of education, not the textbook result obtained at the first attempt.

A major factor in successful teaching is the ability to foresee or to diagnose the student's difficulties. The successful teacher patiently and cheerfully searches for the points at which the student's mind balks, and uses these potential difficulties to encourage creative effort. The teacher is a man who helps change impending failure into success. He carries into the teaching laboratory the attitude he has in research, seeking ways to find an answer to a question. I believe the most successful teaching of medical physiology would be accomplished through research projects of the student's own choosing, for every patient will be a new project, to be explored as an unknown by the physician.

There have been classes where medical students were taught physiology by an instillation of fear. The professor reminded the class that its members never would attain their desire to study patients until the hurdle of physiology had been passed. Examinations in physiology would weed out the unfit. He loaded his lectures with technical facts, many of which seem inconsequential today. The professor lectured like a colonel, his assistants supervised laboratory work like sergeants. Teaching should not consist of saying to Johnny, "You can have your dessert only if you eat your spinach."

I suspect that the day of the elegant lecture is past. We may regret the decline of formal showmanship and eloquence. But we have a better educational device if we hand over the initiative to the students; let them do the talking and demonstrating.

Lecturing, to be beneficial, will show how the teacher utilizes the facts of the textbook to build a connected structure. The concepts of physiology, like other sciences, are meaningful as we assimilate observations into a reasoned scheme. The teacher should be a leader in reasoning.

It will be said that, "My chief does not permit me that much freedom," or "my responsibilities require me to cover so much ground," or "I have too many students to allow me the luxury of individual action." This brings up the question: does a teacher exercise free choice or does he not? Is he compelled to give two courses where one could be given twice as

intensively? Must he cover a prescribed ground? I hope not.

Freedom in teaching is even more important than in other professions. This freedom, however, is compatible with teamwork. Most of us agree that everyone is not a quarterback.

2. *The subject matter of physiology courses* is mentioned here only to say it does not matter much. It is true that medical students are highly conditioned to be more interested in men than in frogs. Most useful is subject matter the teacher can present clearly and forcefully. Usually it is that which he has thought about most.

Any subject can be poorly taught. It can be killed by vagueness, by lack of interest. Also, any subject matter can be taught well. The student receives an unconscious interest and insight from the teacher. And the influence is often reciprocal.

In my experience, students derive plenty of cold information from textbooks once they have been given a clue or have formulated an outline upon which to build, and have their interest aroused.

3. *Teaching is the greatest known stimulus to thinking.* I believe this led most of us into teaching whether we realized it or not. It makes teaching a rewarding experience throughout life.

Students often think we teachers must be bored by repetition. My response is that we never repeat. Every class and every student throw a new light on a subject, especially in physiology where every topic has an infinite number of facets and interrelations.

Teaching means the development of ideas. The teacher must be willing to be diverted from his anticipated procedure, otherwise he is not playing fair with the student. In turn, the student who comes in contact with a creative thinker, who watches the creative mind work, and preferably works with that mind during the creative activity, is cultivating his own powers.

The great realities of teaching and learning are, I think, not to be found in textbooks, methods, laboratories or classrooms, but in the minds of teachers and students. Their minds must be artfully influenced through teaching to work; to create. The measure of their creation is not the grade on the next examination, but the quality of performance many years hence. We must find out how to correlate this performance with the daily interactions of teachers and students during school days.

4. *Effort must go into teaching* as it does into research. The highly trained physiologist is looked to for his marvelous scientific powers in research; yet in teaching he may pump forth facts and dogmas in unreasoned deluge. The very skills that make his research contributions outstanding then are not encouraged in his students, whom he often lets feel are unworthy of his individual attention.

Somehow there has come to us considerable recognition of research abilities. Accolades are given some who accomplish research; sometimes better jobs and increased salaries follow. Until university promotions depend upon effort placed into teaching, good teaching will rarely be done. When our institutions reward the teacher to the extent they now reward the researcher, great teaching will be done.

Specifically, within a department the staff member who shows a liking for, and talent in, teaching must not be rewarded with more teaching. Too often in the past, a physiologist either taught or researched. By shar-

ing alike in teaching, staff members are recognizing the first importance of this activity. Let all members of a department have opportunity to do both.

In particular, I think it important that the American Physiological Society tell the world it is as proud of its members' efforts in teaching as it is of their efforts in research.

It can emphasize teaching effort as a qualification for membership. The society's journals have begun to recognize teaching activities and ideas and needs in their pages. It is hard to believe that materials worth publishing all stem from the isolation of research laboratories.

Conclusion

The principles I have mentioned boil down to these:

1. The rich materials of physiology may fill the students' time with fact-learning. It is the teacher's function to see that students are not too busy to use their minds.

2. If stimulated, the student will take care of his supply of undigested information. The teacher is a leader, helping the student to orient precepts, concepts and critiques.

3. The teacher's interest in the subject is more important than technique of presentation.

4. Basic scientific thinking and creative intellectual endeavor are more important than technical information.

It will be asked if these ideals correspond with what the teacher does with students. The answer is, "in large part, yes." No one accomplishes all he hopes. Sometimes he deviates from his principles. But that does not mean he is unprincipled.

John Dewey, the philosopher in education, confirms my suspicion that "Success in teaching and in moral direction of pupils is often not in any direct ratio to knowledge of educational principles . . ." He says, further, "When, in education, the . . . experimentalist . . . reduces his findings to a rule which is to be uniformly adopted, the result is destructive of the free play of education as an art."

I think it likely that there are principles of teaching, and principles of teaching physiology. None have been validated. Every scientist has a faith that general rules apply in all phenomena, educational as well as physiological. I suspect that the particular kind of teaching I have talked about —call it "opportunist" teaching if you will—must wait a very long time to be reduced to rules of procedure. It emphasizes the give and take which allows every student and every teacher to be an individual. He who finds rules in such diversity will be a seer indeed. Fortunately, teaching can go on, inspire and create, without waiting for formulation of rules.

Advantages and Disadvantages—

Human Physiology for First-Year Medical Students

EUGENE M. LANDIS

AS TEACHERS of physiology we must demonstrate and explain the basic principles of a subject which has a rich history, both as a pure science in its own right and as an applied science, in the advancement of medicine. At the same time, through individual research, we wish to study the basic aspects of function. We hope also to interest and educate students in the principles and methods of physiology as pure science.

We deal habitually with rather large groups of students whose previous experience with science as individuals is apt to be very different. Such differences of preparation and background are an excellent safeguard for the future of medicine, but this heterogeneity presents some problems in the first year and necessarily affects our choice of subject matter, at least for the initial days or weeks of the course.

In another respect, however, classes are remarkably homogeneous because each student already has made an important decision. By the very act of entering medical school he has expressed a desire to deal with human beings and their illnesses. Our problem would seem to be that of using this homogeneity of purpose to emphasize early the complexities of function as presented by the whole human being, and the contribution of physiology through an analytic approach to function, normal and abnormal. This approach should be helpful to our students whether they contribute to medicine and biology by research, practice or both. The problem would seem to be the right use of this unique homogeneity of interest to balance the bigness of our sections and to curb the natural impatience of youths, who sometimes prefer to rush in and prepare afterward.

Judging from experience gained in a medical school which admits a class of 130 medical students annually, a great deal can be accomplished by a suitable introduction to physiology.

To begin the first laboratory hours of a course in medical physiology with a brief, general study of certain gross and simply observable responses of the normal human being (see Table 1) is logical and advantageous. Observing their own responses by measuring arterial blood pressures, heart rates and seeing gross cutaneous reactions, these physicians-in-training can learn at once, with a minimum of unfamiliar apparatus and a maximum of observation, that carefully planned studies on man can be quantitative and re-

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vealing. They can discover, with simple observation, sphygmomanometer and laboratory clock, the meaning of important general concepts such as "the normal state," "range of normal variation," "control observations," "control period," "reaction to stress" and "recovery from stress."

To judge from performance, their interest is generally aroused, whatever their prior training may have been. This introduction makes clear, however, that while man studied from the exterior by simple methods can yield some quantitative answers, these answers themselves are perplexing. For the most part, they suggest new questions which are unanswerable by this simple approach.

The degree of perplexity produced by such an abrupt introduction should not be too great lest a superficial "practical" attitude develop. Nevertheless, as a brief introduction, two days of laboratory work on human cardiovascular function have proved to be a useful and stimulating experience for students, very few of whom have been required to think in terms of several simultaneous variables. As shown in Table 1, the way is thus prepared for a series of classical animal experiments presenting analytically the basic mechanisms involved in cardiac and vascular function.

It has been interesting to observe how the more thoughtful students discover for themselves, with a sense of relief, the value and need for fundamental analytic studies on simplified preparations such as the heart of the turtle, as well as the muscle, nerve, or capillaries of the frog and the smooth muscle of the rabbit's intestine. Even the less thoughtful students, impatiently skeptical of physiology's usefulness to them, are more apt to become interested when they are confronted with some of the perplexing, complicated and interlocking reactions of the intact human being.

If, on the other hand, the more precise and technically difficult experiments on isolated tissues are presented first and without prior experience with the whole human being, some medical students tend to regard these studies as delaying, technical exercises which have no discernible relation to their main interest. Introduced just a little later to help explain problems presented by their own observations on themselves, these same exercises demonstrate first-hand the rule that "pure" physiology has played, and still plays, in medicine.

Since all this is mainly a matter of rearrangement and not any wholesale change of substance, the over-all distribution of subject matter need

TABLE 1

Chronology of Introduction
(total six days)

1. General introduction—2 days of human physiology.
   Arterial blood pressure and heart rate, man—1 day.
   Reactions of cutaneous blood vessels, man—1 day.
2. Analytic studies of circulation—4 days of animal work.
   Turtle heart:
   Function as a pump, chemical control—1 day.
   Studies on heart muscle, nervous control—1 day.
   Frog capillaries—1 day.
   Anesthetized cat, control of blood pressure—1 day.

FIGURE 1

DISTRIBUTION OF LABORATORY TEACHING TIME
ACCORDING TO MATERIALS AND GENERAL PURPOSES

MATERIAL	DAYS 10-1; 2-5	DISTRIBUTION OF TIME		PURPOSE
MAN	11⅔	36%	6%	INTRODUCTION
			30%	ORGANISMAL AND SYSTEMIC FUNCTION
LOWER ANIMALS organs tissues	15⅔	49%	22%	
			27%	TISSUES AND CELLULAR FUNCTION
MISCELLANEOUS	4⅔	15%	10%	SPECIAL PHYSICAL METHODS AND SCHEMATA
			5%	LONG CONFERENCES

not be unduly biased. Figure 1 shows that lower animals, isolated organs and tissues are still used for about half the total laboratory time, with studies of organismal and systematic function divided about equally between lower animals and, when clearly advantageous, man.

Conclusion

A minor readjustment, using as little as 6 per cent of total time for introductory human physiology, stimulates interest and a correspondingly early appreciation of the helpfulness of physiology as a whole. The system used for the introduction is unimportant, providing that enough simple observational methods are available or can be adapted for studies on man.

For medical students, carefully selected and specially prepared laboratory observations on man have certain advantages in that they contribute uniquely to:

1. General interest, particularly at the beginning of the course.

2. Appreciation of the confusing complexity of the whole organism, thereby making an analytic approach clearly necessary and more welcome.

3. Emphasis on careful, unaided observation as a first step with appreciation of its limits. These limits make essential, but subsidiary, the role of complicated apparatus and "tests."

4. Partial recapitulation of man's own historical experience in biology, medicine and physiology.

5. Appreciation of the normal range of variation and the usefulness of distribution curves and statistical aids.

6. Semi-quantitative studies of human reactions to mild stresses.

7. Studies of sensation, discomfort, pain and relevant somatic responses.

8. Demonstration of limitations and advantages of some of the devices used to measure function in man.

Observations on man also contribute, but not uniquely or with special advantage, to:

9. Emphasis on the need for adequate control periods and repeated control observations.

10. Necessity for carefully prepared protocols and records.

11. Helpfulness of comparing group results in laboratory conferences.

On the other hand, to overemphasize human physiology throughout the whole of a first-year course would be a mistake. It is impossible to demonstrate in man exclusively the essence of physiological thought, which is the detailed dissection and analysis of mechanisms and functions, normal and abnormal.

Observations on man are unable to match laboratory work on animals with respect to:

1. Analytic studies of basic functions and mechanisms, which still require anesthetized animals, isolated organs, tissues and cells.

2. Analysis of reactions to severe stress and study of mechanisms of recovery.

3. Introductory studies of pathological physiology, namely the adjustments to hemorrhage, shock and burns.

In summary, for a first-year course in physiology for medical students, carefully chosen studies on man offer unique advantages, particularly in the introductory period. Thereafter, in demonstrating particular functions, the advantages of human physiology are still present but less important. Finally, human physiology can in no way take the place of a large number of analytic demonstrations and laboratory exercises which require animals, their organs, tissues and cells, coupled with more precise and complex methods of study.

The Teaching of Physiology to Third and Fourth-Year Medical Students

ISAAC STARR

NEEDLESS TO SAY, no classes labeled "physiology" are given to third and fourth-year medical students in our school, and I presume that this applies to all other American schools as well. But that does not mean physiology is not being taught, for the physiological influence on clinical medicine has been increasing by leaps and bounds, and in the best medical centers it has become the dominant influence.

It is obvious now that a school of clinical medicine has arisen which views disease not only from the point of view of the necropsy table but also from the point of view of

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physiology; that is to say, many aspects of disease are viewed as physiological processes gone wrong. It is this school which has furnished the climate and background in which renewed interest in therapeutics could arise, because physiological abnormalities are so often susceptible to treatment.

The way to teach physiology to third and fourth-year medical students is simply to teach about disease from the physiological viewpoint, to point out the abnormalities in the physiological processes which have gone wrong, and then to discuss what can be done to restore them to normal. But before I describe the teaching methods I have been using, let me present first some general principles of medical teaching.

It is my belief that the technique of good medical teaching may properly be divided into four steps:

1. Background information (lecture and textbook).
2. Presentation of a problem (laboratory or clinic).
3. The student strives to solve the problem.
4. The student's solution is criticized.

I must avoid giving you the impression that I belive there is anything new about this formulation; certainly good medical schools have used these as the basis for their teaching programs for many years. But this has not always been the case in the United States, and it is not the case today in many European schools. Even in the best schools in our country there are lapses from the ideal, particularly in the fourth item: criticism of the student's solution.

Every course in every school worthy of the name must cover the presentation of background information. This can be given through lectures or reading assignments. In fact, until very recently there was a medical school in America that had no clinical facilities whatsoever. All clinical teaching was done by lecture.

Courses given in many schools are nothing but lectures. Even so, I suspect that most of those who condemn lectures completely have no talent for giving them. Certainly if the lecturer cannot be heard, or is unable to organize his material, or is unable to distinguish between the important and the unimportant, other methods of giving background information should be sought. Alternative methods of presentation, however, often are not very satisfactory. You can have the students read textbooks, but good texts are hard to find. Most are much too long, and since writing and publishing take years, the information is likely to be somewhat out of date. This requires that the teacher present the latest information available and help the student distinguish between more and less important matters. Since there is likely to be a good deal of this to do, the teacher might as well organize the material as a lecture. Also, the class as a whole cannot be sent to the library to read original literature on single topics; there are not enough copies to go around.

But I think every student of education will agree that the lecture-only type of teaching, so passive from the student's point of view, is the lowest form of educational activity, and certainly every good course in our better medical schools has gone on to the second step, the presentation of a problem to the students. In the first two years this is accomplished well in the dissecting room and in the laboratories. In the last two years it can be done equally as well by bringing the student in contact with patients in the clinic.

TABLE I—Fourth-Year Correlation Course

The Physiological Basis of Therapeutics

The subject of the weekly student conference is usually the same as that of the lecture which precedes it. The lecturer acts as student conference leader for the week of his lecture. Staff conferences deal with general aspects of the material covered in the preceding group of lectures and are held at the end of each division.

Group Subject	Lecture
General	Addiction to Drugs
	Relief of Pain
	Relief of Anxiety
	Staff Conference
	Acid-Base Disturbances
Pulmonary	Pulmonary Pathologic Physiology
	Bronchial Asthma
	The Pulmonary Invalid
	Staff Conference
Renal	Renal Pathologic Physiology
	Fluid & Electrolyte Balance
	Fluid & Electrolyte Balance
	Treatment of Nehritis
	Staff Conference
	Chemotherapy of Neoplasms
	Drug Economics
Circulation	The Ballistocardiogram
	Theory of Congestive Failure
	Coronary Heart Disease
	Neurocirculatory Asthenia
	Peripheral Vascular Disease
	Arteriosclerosis, Reflex Factors
	Staff Conference
G. I.	Peptic Ulcer
	Parenteral Feeding
	Liver Disease
	Staff Conference
Hormones & Metabolism	Carbohydrate Metabolism
	Diabetes Mellitus
	Hormonal Therapy
	Chemistry of Hormones
Antibiotics	Chemistry of Antibiotics
	Newer Antibiotics

The usual clinical method is to require a history, examination, simple laboratory tests and a progress report for each patient assigned to the student. The difficulty comes because the student, often overworked, knows perfectly well that the physical examination and laboratory tests will be repeated by the resident staff. Therefore, he may be tempted to neglect this work or copy their results.

It is my impression that the checking of students' work is likely to be done poorly. This must be improved if physiological aspects of disease, still strange to many clinicians of the old school, are to be presented successfully. The best solution will come only when most clinicians are better versed in physiological information than they are today.

Course at Pennsylvania

The course I am about to describe has evolved from one which was begun about 1924 under the direction of Dr. A. N. Richards and was then called "Clinical Pharmacology."

At present the course is given in the fourth year. The first term is under the direction of the department of pharmacology, while the second half is organized on an interdepartmental basis. One lecture and one conference are scheduled for each student every week, the class being divided in half for the conference, making three hours a week for the instructor.

An outline of the schedule for 1951-52 is shown in Table 1.

I give about one quarter of the course and others have been asked to take part because, in addition to their clinical interest, they have more than the usual amount of physiological training and experience. They have been assigned subjects which accord with their present research interests. Indeed, the content of the course has been set more by the research interests of the personnel available to teach than by any other consideration.

Teaching Technique

The teaching technique of the the course is as follows: disease is described from the physiological viewpoint, insofar as this is known. The lecturer describes the evidence for these concepts and the effect of therapeutic measures upon the abnormal physiological process.

The content of the usual medical lecture—the life-history of the disease, description of symptoms and physical signs, the emphasis on criteria of diagnosis and autopsy findings—are not given. The fourth-year student usually is sufficiently familiar with these to permit him to synthesize the physiological aspects with the other information.

Student Conference

At the lecture each student receives a summary case work-up, with diagnosis. If possible, the patient should be available to be shown to the students. A conference takes place three or four days after the lecture and each student is asked to bring in his recommendations for treatment, analyzing each item of therapy from three points of view: (1) purpose, (2) expected results, and (3) possibilities of harming the patient.

The purpose of these written reports is to make the student think about the problem and commit himself to a plan of treatment before he comes to the conference.

Experience has convinced me that unless the student does some work in advance, the conference is likely to be a poor one. If he comes without preparation he will not talk for fear of exposing his ignorance. There is likely to be no conference in the true sense of the word. But if the student has thought about the subject in advance, he will be willing to argue in defense of his commitments, and this makes the conference go, provided the professor does not discourage free discussion by taking marks and is kind in pointing out errors.

From the pedagogical point of view, much more skill and effort is required to run the conference successfully than to give a lecture, but there can be no doubt that as an educational experience for the student, the conference far surpasses the lecture.

Different teachers run these conferences in different ways. My own technique consists of attempting to get the students debating with each other. The debate is directed away from such matters as reaching a diagnosis and toward the physiological aspects and therapy of the disease. For example, I might start off the conference by saying, "How many of you believe that the edema in this case was due to trouble with the heart?" And after a show of hands, "How many of you believe that it was due to trouble elsewhere?" After another show of hands, I ask, "Who will volunteer to state the case for those who believe the trouble is primarily cardiac?" Then I call on the other side for an

opinion. By this time several students are anxious to be heard. This leads to a discussion of the disturbances in normal physiology most likely to be occurring in the patient.

We then go on to therapy. I ask, "What did you who believe the trouble was cardiac decide should be done?" "How many of you prescribed digitalis?" "What response would you expect?" "Is there any danger connected with it, in case your original estimate of the case was wrong?" and other questions.

A lively debate usually can be started over subjects of this kind and the hour is filled easily. At the end I discuss what actually was done in the hospital and the effect. After the class has been dismissed I usually am surrounded by a group of students who are anxious to continue the discussion.

The students hand in their papers at each conference and what is to be done with these presents a problem. They would like to have the papers corrected in detail and handed back. But with classes of 125 or so, this is too time-consuming for the instructor. It could be done if there were a medical school department organized for the purpose of giving such a course, but we have nothing like this, nor am I convinced we should. At present the course is an interdepartmental one and perhaps some of its strength comes from the many points of view presented to the students. While it is proper to ask the gentlemen who take part in the course to undertake a few hours of teaching each year, it is not proper to ask them to spend several days correcting a large number of papers, a job which should be done well or not at all. Therefore, I simply have my secretary make a note of the students who have handed in papers in order to check on those who have not. And I look over a certain number of the papers each time to see how well the course is going.

Staff Conference

One other new teaching form has arisen in this course. We call it the staff conference. I must admit that this was aimed originally at the younger clinicians of the school rather than the students. But it has worked out very well from the students' point of view.

At the end of every division of the course a staff conference is held, which means that the clinicians who have a special interest in that field are invited to come to the conference and sit on the stage. Again the technique has varied, depending somewhat on who was conference leader. If I am scheduled as conference leader I generally make a tour of the hospital wards to find out just how clinicians are handling common situations. I write my findings on the blackboard and ask for criticisms from the clinicians themselves and from the chemists, physiologists and pharmacologists who have been asked to take part. Discussion among the faculty is likely to be lively and the students, while they do not take part in the discussion, can ask questions, and they have a high opinion of the hour. I had hoped that it would be educational for the resident staff too, but this overworked group has difficulty finding time to attend.

Examinations

For many years, we gave a final examination of the open-book type. Students were permitted to bring books into the examination and consult them. I am strongly in favor of examinations of this type. Medical subjects are far too vast today for

any of us to commit them to memory in their entirety, and our aim must be to teach the students to make use of all the aids that will be available after they graduate. So we must teach them where to find the information they need and how to look up data in the literature. The open-book type of examination measures our success or failure in educating the students along such lines.

Some care is necessary in setting the questions in an examination of this kind. The question whose answer is obtained readily from "Useful Drugs" is best avoided, as the students can be counted on to have this book in their pockets. In questions designed to test the student's factual knowledge, I have generally sought information of a type not found in one place in any commonly used book. More and more I tend to ask questions involving judgments, and in these the books help but little.

The time limit, which is strictly enforced, does not permit the students to learn what is in their books during the examination. So the books brought in help the student little unless he is very familiar with their contents. Indeed, if he knows how to use his books rapidly and effectively, he will deserve the high mark he will get.

I believe firmly that the open-book type of examination is more logical and a better test of ability than the old-fashioned type which was so largely a test of short-term memory. Students accustomed to doing well in the classic type of examination do not always do well when pitted against the open-book type; and conversely, some students excel to a degree not expected from their other marks. You get a rather different impression of the abilities of the class, and I belive it is worth having. I like to think it gives a better basis of prediction of eventual success, but I have no significant data to report on this.

This type of examination generally has been popular with the students and many have come to me with stories indicating that it was a valuable educational experience. In the early days of the course there were always one or two who, hearing that they could bring books in, decided that the examination must be so easy that study of the subject was not necessary. They were utterly discomfited at the examination. Then, often, a boy would bring in $50 worth of books and, not knowing where to find anything, would fail ingloriously. Many have told me how little the books helped them.

So, as you see, I am a strong partisan of this type of examination, and it is an anticlimax to state that for the last three years, since the introduction of a general comprehensive examination on the whole medical school curriculum at the end of the fourth year, this has covered the ground and we have not given any special examination in the course itself.

Report of Student Committee on The Medical Students' Point of View

GEORGE W. ALLEN, EUGENE BRAUNWALD, MARVIN L. DAVES, BUEL S. SMITH, PETER STOKES

THESE CRITICISMS and suggestions concerning the teaching of physiology in medical schools represent the consensus of the students in the schools we attend. They are the results of numerous conferences and discussions. As these progressed, we became more clearly aware of the problems inherent in the teaching of physiology.

We have subdivided our presentation into the following topics: the general aims of a course in physiology, methods of approach, the correlation of physiology with the rest of the four-year curriculum and certain special topics such as the faculty, grading and examinations.

Physiology offers the student his first experience with the scientific investigation of problems in medicine. The well-taught course will take full advantage of this opportunity to give the student a method of approach to the study of medical facts and the solution of problems. This lesson, well learned, will be an invaluable aid throughout the rest of his career.

Secondly, physiology teaches the function of the human body. In this fact lies the unique importance of physiology among the basic medical sciences, for it is with the beginning of the study of function that the student first deals with a viable cell, a viable organ, a living man. Teachers of physiology will be aided greatly by the tremendous enthusiasm the student brings to his study of the course. To preserve this advantage and make the most of the time allotted, the teaching program must concentrate on human physiology. It is also the duty of the teacher to emphasize those aspects of physiology which will in some way contribute to the understanding and treatment of disease. We do not mean that nothing can be taught except information which is immediately useful in handling patients. Often, however, subjects only of academic interest receive undue attention because of the special interests of the professor. The time allotted to physiology is too limited to permit such luxury.

We would like to discuss the component parts of a physiology course—the lectures, readings, laboratory work and conferences. The importance of coordinating these component parts must be stressed. One of the criticisms most frequently heard about any laboratory course is that the material studied in the laboratory may be covered in lecture weeks before or weeks later. The student often complains that laboratory experiments are not related to the rest of the course. We recognize that financial limitation of equipment and instructors often make it impossible for all students to do the same experiment at one time, yet coordination is necessary. Too, accent upon

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This report was written by a student committee from each of five medical schools. Students and their schools are: Mr. Allen, Columbia; Mr. Braunwald, New York University; Mr. Daves, Johns Hopkins; Mr. Smith, Pennsylvania; Mr. Stokes, Cornell.

human physiology remains of prime importance in the teaching of physicians. It is obvious that financial problems and difficulties of coordination are thereby increased. Perhaps the only answer is a compromise situation. Part of the financial dilemma may be answered by later suggestions. It remains that disintegration of the order of topics covered in lectures, laboratories and conferences is to be condemned.

We have considered the arguments against the value of lectures. We admit the great need for improvement in the technique of lecturing, but we believe the lecture can be a valuable part of instruction if it is presented in such a manner as to be digestible, directive and informative. By digestible, we mean simply that the basic rules of public speaking must be followed. A faculty member need not be a brilliant lecturer in order to organize his material and present it in an audible voice at a perceptible rate, with legible blackboard writing.

By directive, we mean that the good lecturer directs the student's attention to important points, providing him with a framework of understanding on which he can place in an orderly fashion the facts and observations he encounters in his reading, laboratory and clinical work.

Lectures provide information in a personalized way, emphasizing the lecturer's point of view and indicating such departures from this point of view as may exist. Such a presentation adds interest to the material and helps fix it in the student's minds.

In addition, lectures offer contact with the great personalities in a particular field. We would like to point out that frequently a man in one of the clinical departments, such as gynecology, is better prepared to lecture on a certain phase of physiology than any member of the physiology department. Such outside talent should be used whenever it can strengthen the course. The man with the greatest technical knowledge, however, does not always give the best lecture for beginning students.

In summary, we believe that the solution to the problem of poor lectures is not to abolish them but to improve them.

Reading Material

The second important source of information for the student is the textbook and other reading material. We feel that the teaching staff should indicate which four or five texts are generally considered best and in what respect each is thought to be superior. The regular assignment of specific pages in a certain book is an unnecessary and immature approach which encourages an immature response from the student. With regard to literature, it must be remembered that each time the student starts a new course, he faces the problem of familiarizing himself with the mass of publications available. We recommend that references be given mainly to such good review articles as may exist. The bibliographies which they contain will guide the student to more specialized information.

Next, laboratory work must be considered. Its importance is so apparent as to make any justification of it unnecessary. Unfortunately a great drawback to the adequate presentation of this material is frequently a financial one. Such resources as are available should not be squandered on experiments which have only historical value, or on experiments which do not illustrate basic principles of human physiology. The staff

should strive toward a program whereby the work is performed in small groups of students with an adequate number of competent instructors available to each.

Seeing, doing and thinking are the three essential ingredients of learning. During an experiment, seeing and doing are at an optimum, and herein lies its great value as a form of instruction. Unfortunately, it is just at this time that the third leg of the tripod, the thinking, is shortest. Many schools have found that the informal conference of an instructor with a small number of students is an ideal way to bridge the gap.

The conference system has several disadvantages. It is rather costly in terms of the instructor's time. The informal atmosphere encourages the instructor to skip from one trivial point to another without direction or purpose and to devote a great deal of time to an insignificant question which is of interest to one student only. On the other hand, the conference provides an excellent opportunity for the student to ask questions of his colleagues. This can be most helpful if everyone recognizes the necessity of limiting discussion to important questions of general interest. A conference discussion can be valuable if it emphasizes the fundamental principles demonstrated in a recent laboratory experiment and makes certain that no one loses sight of these principles. The conference enables the student to compare his results with those obtained by other groups and to seek explanations for whatever differences there may be. It gives the instructor an opportunity to evaluate his students and at the same time evaluate the lectures and laboratory work. The conference system can be a mainstay in correlating various aspects of the course. The rotation system, imposed by accenting human physiology with a limited budget to finance equipment, can be partially overcome and better coordinated by use of the conference. We believe that in good hands the conference system will be a helpful addition to any course.

Course Correlation

The correlation of physiology with other preclinical sciences and with clinical medicine is a function fully as important as actual teaching of the formal course. This correlation should be directed into three channels.

First, during the first two years it is essential for each faculty member in each department to be fully acquainted with the entire subject material covered by the other departments. Only in this way can he view objectively his personal contributions to the student's medical education and avoid unnecessary repetition. We recommend that each preclinical department invite the members of all the other preclinical departments to a meeting to present to them its curriculum in considerable detail. When this is completed, the various chairmen can decide how to eliminate duplication and use the time saved for putting greater emphasis on subjects not covered adequately. This correlation between the various courses can be maintained quite easily if, during the several similar conferences of the academic year, each department presents to the others the changes in its curriculum, discusses problems and reviews past efforts at correlation.

The plan adopted at Western Reserve University School of Medicine, and supported by the Commonwealth Fund, in which an instructor attends

all the classes of a group of students for an entire year is another solution to this problem. This instructor is in a position to advise the various departments on how their course correlates or fails to correlate with that of the other departments.

We urge that, whenever possible, faculty members attend some of the classes given for their students by other departments. This would aid greatly in smoothing interdepartmental correlation.

The second important phase of correlation is one with which many schools have made considerable progress—the correlation clinic of the first two years. In these a clinician demonstrates a clinical problem, the solution of which deals intimately with the subject covered in the physiology course. Correlation clinics give students added incentive and inspiration for studying subjects which they otherwise may feel have little bearing on problems they will face for the rest of their medical lives. One hour devoted to showing the student the importance of his work to every 15 to 20 hours of classroom and laboratory work in the preclinical years is probably a good balance. It is important for physiologists to accompany their students to these sessions, so that they can contribute to the discussion and so that they will be fully aware of the clinical applications of the material they teach. The clinician who leads these conferences is urged to be fully cognizant of what the students have been taught.

Thirdly, we recommend strongly the continued presentation of physiology and the other basic sciences in the third and fourth years. It is unfortunate, but true, that many students lose close contact with physiology at the end of their formal course in the first or second year. Because physiology is so important to the physician's proper practice of medicine, it should be taught up to the time of graduation. The teaching of physiology during the last two years may take several forms. These include a formal course in pathophysiology, the participation of the physiologist in all of the clinical conferences, and combined clinics, in which a disease is presented from the point of view of the basic scientist, the pathologist and the various clinicians.

Other Recommendations

Though arising from our discussions on the teaching of physiology, the following recommendations apply equally to other branches of undergraduate medical education.

Students agree that emphasis should be placed on teaching ability in selecting and promoting faculty members. The departmental schedule for research and teaching should be planned so that the student receives maximum benefit from the teaching abilities of the staff.

A man's prestige in his department should not depend solely on his investigations. There is an unfortunate tendency for many faculty members to regard teaching as an unpleasant duty to be disposed of as quickly as possible in order to continue an uninterrupted program of research. Too often the prestige, recognition and financial gain of an individual in the department are in direct relation to the number of papers which appear in accepted journals. Publication in itself is not to be condemned but rather fostered. It is to be condemned only when it exists to the exclusion of rewards from other endeavors. We do not suggest that teaching and research be divorced in department

organization. That students should be denied contact with men actively engaged in research is not our aim, but that more effort be spent in an attempt to stimulate interest in pedagogic problems and to encourage those staff members who have such interests. More time in faculty conferences should be spent in studying the problems and techniques of teaching, perhaps to the extent of conducting a special course in this art.

We would like to propose the following methods of encouraging good teaching and to commend those foundations which already have instituted similar plans:

1. Fellowships for graduates of medical schools to attend undergraduate classes and other exercises for the purpose of detecting deficiencies in the curriculum and offering suggestions for improvement.
2. Exchange teaching fellowships.
3. Awards for good teaching based on student vote.
4. Encouragement of course critiques by students.
5. Stimulation of private medical industries to an active monetary support of teaching programs, as well as research programs, in medical schools.

It should be emphasized that the primary goal of the medical school is the preparation of future physicians. Contributions to basic medical knowledge and community health care, important though they are, should be woven around the central theme of teaching physicians. In this way the health needs of our country can be met. Unfortunately, medical education sometimes seems to be relegated a subordinate position.

Grading

Students are unanimous regarding the advisability of de-emphasizing grades. We agree that some form of record regarding each student's ability is essential. However, in some schools, grades are stressed in the wrong manner. All students do not have the same ability, and we do not wish to foster any false idea that they might be so considered. The relative standing of any two men in a class is of little import. Students should be made to know, through the efforts of the faculty, that knowledge and the ability to use it are of paramount importance. A man should be told when he is doing unsatisfactory work and when he is performing adequately. To give him a narrow numerical or alphabetical rating is of no more aid, satisfaction or stimulus to him.

The committee could not agree on the frequency or type of examination which should be given. Examinations should attempt to measure a student's retained knowledge and his facility and flexibility in using it. Frequent examinations, including all kinds, have the advantage of allowing multiple testing with varied techniques and put less numerical emphasis on each examination. This often tends to create a more relaxed attitude toward examinations. Many questions remained unsettled within our group. Should some of the tests be oral, others written? Should short answer quizzes of various types be interspersed with essay type examinations? How often should they be given? Should they cover any work previously handled or just "last week's assignment"? On all these queries the committee was divided.

We were in accord on this: motivation for study should not have its origin in examinations. We believe that teaching which incorporates the ideas we have suggested will plant adequate motivation for study where it should be—in the value of knowledge for its future application.

The Point of View of Practicing Physicians Toward Teaching Physiology in Medical Schools

JULIUS H. COMROE JR.

IF THE MAJOR purpose of medical education is to train men to practice medicine, then the men in practice should be asked if their training in the physiological sciences has been ideal, or at least adequate for the intelligent practice of medicine.

I have obtained information from two groups of physicians. Both groups sought postgraduate training in physiology or basic sciences for periods ranging from one week (postgraduate course, "Physiological Basis for Internal Medicine," sponsored by the American College of Physicians) to one academic year (Basic Course in Graduate School of Medicine, University of Pennsylvania). I recognize that this group is not representative of several hundred thousand men and women practicing medicine and surgery, but I selected them for the survey because I believed they would give serious thought to the matter.

I did not send a questionnaire because I wanted to avoid leading questions. I simply wrote letters to 400 of these men and asked for any comments that might help us evaluate the job we have done in the teaching of physiology in the medical schools. Forty per cent of the 400 answered; some wrote very long letters that obviously took considerable time and thought.

On many points their opinions were far from unanimous. Some liked their courses in physiology; some did not. Some recalled their teachers with pleasure; a few confessed they could not even remember the names of the physiologists who had taught them. Some wanted fewer lectures with more visual aids; some wanted better lectures by more inspiring teachers. Some wanted less laboratory, especially nerve-muscle preparations; some wanted more laboratory work. Some wanted less time spent on the mechanical details of setting up the laboratory experiments. Some wished they had been given a research problem during the course or during summer vacations. And the latter commented that the physiology laboratory is an ideal place and time to learn the experimental and scientific attitude. Some specially requested more work in small groups and more intimate contact with their teachers.

Of all the comments in these letters, three appeared with great regularity:

1. There was emphasis upon the key position of the physiological sciences in medical education and in medical practice. The impression gained from reading their letters is that they realize, almost more than we do, the tremendous importance of physiology in medicine today.

2. At least some clinical medicine should be introduced into the first-year course by correlated clinics, physiological ward walks or bringing patients into the laboratory occasionally. These physicians are thoughtful men. They do not want the physiology course to become a course in clinical medicine, but they do want more mention of the clinical

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importance of each subject under study. They feel, as does the student group, that they would have been more enthusiastic, would have learned more (and also remembered more) if there had been even the briefest mention of how the science under discussion fits into the over-all picture of medicine.

3. Teaching in the physiological sciences should be continued into the second, third and fourth year of medical school. As one physician put it, "the student will *never be conscious of having ceased to study or apply physiology.*" These physicians are less critical of what we physiologists teach than they are of what we do not teach. They believe that information gained in the first-year course in physiology, no matter how excellent, cannot suffice for a lifetime of practice and, furthermore, that the scientific attitude acquired in the physiology course needs periodic reinforcement and renewal.

How do they believe this can be achieved in the medical school curriculum? (1) By regular physiological-clinic conferences; (2) by further training of clinical teachers in the physiological sciences; (3) by routine study of clinical cases from the physiological point of view in addition to the usual history, physical examination and laboratory study; (4) by an integrated course in all the physiological sciences in the fourth year.

The reading of these letters was exciting and inspiring. These men, in practice, want more physiology. They believe that the learning of physiology is a lifetime process. Are we, as physiologists, doing the job they want us to do? Six years ago a survey by the APS showed that only one medical school had a formal course in physiology in the third year and only one school had such a course in the fourth year. Less than 8 per cent of teachers of physiology instructed in clinical physiology of any type, although 36 per cent had the M. D. degree.

Has the teaching of physiology changed significantly in the six years since this survey? Do these criticisms of older physicians no longer apply? A few physicians questioned their sons, now in medical school, to settle this point in their own minds. Many more questioned interns and residents. For the most part, they felt that the need for sufficient training in physiology had not been met by most schools. No recent survey has been made. Probably the best thing we can do is to ask ourselves these questions:

1. Do we believe that the teaching of physiology to freshmen medical students represents our total obligation to the physiological training of physicians?

2. Is the continuation of physiological instruction into the clinical years organized or left to chance? Should it be?

3. Is clinical physiology taught only in the department of medicine or does it extend to surgery, pediatrics, neurology, obstetrics-gynecology, urology and other branches of medicine?

4. Do we believe, as these physicians do, that the learning of physiology is a lifelong process? If so, are we doing all we can toward that goal?

The Short Motion Picture

for

Medical School Classroom Instruction

Medical Audio-Visual Institute
of the Association of
American Medical Colleges

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Concepts of the Short Film with Reference to Medical School Classroom Teaching

Introduction

IN POSTGRADUATE MEDICINE the medical teaching motion picture has been a comparative success, as witnessed by its extensive continuing use. In the medical school, however, the highly individualistic approach of the instructor, his lack of knowledge of effective methods of film utilization and his justifiable disinterest because of the extremely uneven quality of available medical motion pictures have been obstructions to the broad and obvious applications of films within his classroom domain.

Of the many possible factors concerned with the present inadequacy of films in medical college usage, perhaps the most significant is individualism. Individualistic teaching is healthy when it is intensely up-to-the-minute in incorporating the latest of medical research into its presentations, but unhealthy when it is jealous of inviting an expert visiting professor, even in a motion picture, onto its premises. It is quite possible that, paradoxically, the individualism which is the strength of medical research and clinical judgment may be the principal obstacle to better utilization of films in the classroom.

The conventional medical films produced for county society and hospital staff programs are designed to stand by themselves. They are rounded and reasonably complete messages from an individual author, or from technical advisers working with a sponsor and producer. They usually are well flavored with personal opinion, contemporary theory and have much filler material to round out their stories. Sometimes they are from 50 to 60 minutes long, but the usual range is from 20 to 30 minutes, half a standard class period. Such films are used relatively infrequently in the medical colleges, possibly because they are what Markee[1] calls "substitutional films," films which substitute for the teacher. The primary assumption of the Institute in its exploration of short films has been that such films fit neither the time schedules nor the individualistic teaching methods of medical college instructors, and that a generically different type of film approach is required.

Slides are the flexible and familiar personal tools of every medical school instructor. "Slides-in-motion," short films which enable the operator to exercise the same choice of arrangement and selection as slides, are conceived to be one probable answer to a more fitting film utilizational pattern in the medical schools. The historical precedents are persuasive. The rationale of use seems entirely logical. The production methods and pitfalls are to be investigated.

It has seemed appropriate, therefore, to explore the production and utilization of simple short films whose substance and form might lend themselves to the medical instructor's intellectual and emotional acceptance. Without this acceptance no film, however excellent intrinsically, can reach the student audiences. At this

time in the development of audiovisual teaching methods, emotional acceptance is considered far more important than intellectual approval. Strong motivation is needed to carry the teacher into and across the often difficult processes of successful and facile film utilization in the classroom. Emotional acceptance is gained for short films because they lend themselves almost completely to the individual instructor's adoption as his own property. In this process of self-appropriation they obviously strengthen his teaching. But especially they fortify his ego-satisfaction, without which the instructor might possibly be in lucrative practice rather than on a faculty.

Short films have certain broad criteria which fit them for their intellectual and emotional acceptance by medical teachers. Each has a single and unitary function limited to one medical or biological phenomenon, to one concept, process or action which is better illustrated by motion than by still photography. Short films serve much the same function as the lantern slide, blackboard drawing and illustration, by picturing an item while it is discussed by the lecturer or studied by the student.

Length is determined by the intrinsic stuff of the film short, not by arbitrary time or reel length standards of any kind. And each film is of a level of film craftsmanship sufficient to forestall any honest esthetic objections to utilization, for this too is a subtle emotional deterrent to personal adoption of materials produced by others.

Each short film constitutes a building block unit. Each can be combined readily with other short films, with other types of audiovisual media and of course with words. Because of their nature, it is conceived that short films will tend to evoke a new level of audiovisual classroom teaching where all media of communication are integrated, since the very brevity of single films will militate against their use alone under normal classroom or staffroom situations.

Historical experience would appear to indicate that a large number of short films is necessary in any one area of medical teaching in order to provide sufficient material for adequate utilizational trials and to justify the work of classroom preparation required for easy use. In the past, sheer numbers of short films have appeared to be critical in overcoming inertia and in evoking sustained and strong instructor interest. Therefore, in order to tip the scales toward purposive action, *enough* films are needed in selected subject matter areas.

Finally, there are many sources of short films. A legion of shorts lies hidden in the existing motion pictures of research, record and instruction. Such films are mines to be worked for their precious nuggets. Short films also can be made with relative ease by camera enthusiasts among instructors, for their personal needs. Clinical photographers servicing medical centers, and commercial producers and sponsors will supply many more. Workmanship and inherent value will largely determine which films will arrive ultimately in the channels of mass distribution.

In brief summary, the individualistic teaching approach of the medical school appears to demand slides-in-motion, in large numbers. The proof lies in the large scale test of application.

David S. Ruhe
Director
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The Development of the Short Film in Medicine

ADOLF NICHTENHAUSER

FIFTY-SIX YEARS after the introduction of motion pictures into medicine, the standard medical school courses of study would be expected to be liberally supplemented by films which help the teacher as he proceeds with his lecture. Yet the courses are not supported by films of this kind, nor have the teachers of medicine formed a habit of adapting other types of motion pictures for use as closely integrated lecture tools. Of the thousands who have acted as authors of medical films, only a handful has been fully aware of this possibility of creating motion-picture illustrations or demonstrations suited to accompany any other teacher's oral presentation.

The Medical Audio-Visual Institute of the Association of American Medical Colleges has therefore considered it pertinent to demonstrate, in one area of teaching, that short motion-picture units can be designed which fuse easily with the other media of systematic instruction and at the same time provide a learning experience not duplicated by those other media.

Dr. Nichtenhauser, a former staff member of the Medical Audio-Visual Institute, is a medical and educational film consultant. Data in this article have been derived in part from research material he prepared for his study, "A History of Motion Pictures in Medicine," originally sponsored by the Audio-Visual Training Section, Bureau of Medicine and Surgery, Department of the Navy, and now being completed under a contract from the Office of Naval Research.

The Work of the Pioneers

The idea of using motion pictures to illustrate and integrate medical teaching is by no means new. As a matter of fact, it was dominant during the first two decades of medical motion pictures, from 1897 to about 1915. The medical film pioneers acted from a single, strong impetus: that it had become possible to photograph and preserve movement. The attention of these men, therefore, was focused on individual motion phenomena rather than on their context. As far as the cinematographic endeavors of the pioneers were motivated by their being teachers, they concentrated on the visible sign or signs of a clinical case, an individual microbiological phenomenon or the principal features of a surgical procedure.

This approach was determined by the novelty of the film experience but also by the technical difficulties and limitations and the considerable expense of applying the new medium to the medical and biological sciences. Therefore, during the early period a single shot of a patient or microscopic phenomenon was regarded as a motion picture, which, in the literal sense, it actually was. Until about 1915 most medical and biological films were very short, averaging from a fraction of one minute to three or

four minutes. Even surgical films did not as a rule exceed such brevity.

Neuropsychiatry: Because the disorders of movement offered a rich field for the new motion-picture camera, neurologists were among the first medical film makers. In 1897, only a little over a year after the first public exhibition of motion pictures, Paul Schuster [2] of Berlin recorded patients with Parkinson's disease, myoclonus, hemichorea, ataxia, spastic paresis, hemiparesis and Romberg's sign. Some of these views lasted only from three to 10 seconds and were shown by means of loop projection, while others ran for about one minute. Schuster emphasized that he had made these films in order to illustrate his lectures free from the limitations of the case material of his clinic and to overcome the difficulties inherent in the direct observation of complex motions.

In 1910 Hans Hennes [3] of Bonn filmed the pathological movements of 19 neurotic and psychotic patients. He pleaded for the general introduction of motion pictures into the teaching of neuropsychiatry. While stressing that films never should attempt to replace clinical demonstrations, he pointed out that they could be projected at any time, whereas psychotic patients often would not produce their symptoms in the lecture room or could not be taken there at all. If films on all important conditions were available, teachers would not be handicapped by the gaps in their case material. Moreover, motion pictures often presented graphically such phenomena as could hardly be described by the written or spoken word.

It was Theodore H. Weisenburg [4] of Philadelphia who, during that period, made the methodically most advanced contributions to motion pictures as a tool of neuropsychiatric teaching. Beginning in 1908 he made, with the assistance of a cameraman, films on all important functional and organic nervous diseases, showing the different types of gaits, tremors, convulsions, tics, spasms, reflexes and ataxias; physical examination methods for these conditions; psychotics with catatonia, mania and pareses; and the physiognomic expressions in various mental disorders. By 1912, Weisenburg's films totaled about 10,000 feet of 35 mm. film; this represented a screening time of two hours and 40 minutes, which meant that the individual items were shown only briefly.

In his work with motion pictures, Weisenburg acquired considerable insight into their values for research and teaching. In the latter respect, he had found that students learned better from films than from patient demonstrations. While of course not giving up the demonstrations, he employed films routinely in his course, first lecturing on a disease and then showing the footage pertaining to it. In the beginning he used four or five minutes of film to demonstrate a patient. Yet soon he discovered "that it is vastly better to show for about a minute a particular gait or patient in whom there is only one thing to demonstrate . . . because the onlooker becomes tired of seeing the same thing for more than that period." Later he reduced that time to 20 or 30 seconds. "For example, I illustrate the catatonic form of dementia praecox by having the patient appear on the screen for less than half a minute. It is vastly better to have many subjects of 20 feet at a time than to show one patient, no matter how good, for a greater length of time. In dementia praecox 26 patients are used to illustrate the disease." Although

Weisenburg might have more fully integrated the individual views by inserting them as he proceeded with his lecture, he apparently preferred the continuous projection of all the half-minute items on a disease after finishing his oral presentation.

The brevity of such case demonstrations was taken for granted by the German orthopedist, A. E. Stein,[5] who filmed patients before and after treatment. "The expense of making motion pictures is often overestimated," he wrote. "For in most cases the views to be taken are not of long duration but short repetitious phenomena for the reproduction of which three to six feet of [35 mm.] film [3 to 6 seconds] are sufficient. The ends of the positive, on which the view has been printed either once or several times in succession, are spliced and a so-called endless film [loop] is obtained which can be projected for a longer time."

For purposes which must have been similar to Weisenburg's, the outstanding French scientific film producer, Jean Comandon, a microbiologist and physician himself, produced in 1919, with the neurologist Edouard Long of Geneva, a series of 54 films on the common disorders of the nervous system. These films, which ranged in length from one-half to five minutes, must have lent themselves easily to close integration, but nothing has been reported about their actual utilization.

Microbiology: It was also Comandon who, 10 years earlier in 1909, had begun to develop cinemicrography as a method for his microbiological investigations. Encouraged by the great film industrialist, Charles Pathé Comandon adapted his research footage for instructional use and, within a few years produced many short cinemicrographic films, particularly in the fields of hematology, cytology, bacteriology, parasitology and protozoology. These carefully edited motion pictures, most of them running between one and three minutes, aroused the enthusiasm of physicians and biologists wherever in the world they were shown in meetings or conventions. While some of these films distributed by Pathé's worldwide organization found their way into the early movie houses, they apparently were employed very little where they belonged—in the courses in medicine and biology.

However, the literature has preserved a few comments by teachers who did use the cinemicrographic films made by Comandon and others. G. Olpp[6] of Tübingen, Germany, who employed motion pictures in his lectures on tropical diseases, in 1912 pointed out that many of the exotic micro-organisms and their vectors shown in the films hardly could be brought to Europe alive. A year earlier, R. Kutner[7] of Berlin had contrasted the durability of the motion-picture record with the instability of living specimens. Films were always ready for use, he emphasized, while microscopic or animal experiments in the classroom often required difficult and time-consuming preparations. Moreover, they tended to be failures nine times out of ten, whereas a film was a success every time. He continued: "Remember how much time was previously lost in the courses when during or after the lecture many students were looking into the microscope set up for them, or when a directly visible experiment was demonstrated. What a difference exists today. An electric button is pushed, the room darkens, the film is projected to the words of the teacher and the lecture is resumed. Only one who taught in the past and

teaches now can realize how greatly this quick change from lecture to demonstration has facilitated instruction." And in similar vein, Kutner praised the role of films in surgical teaching, where they allowed the audience to study the phases of an operation before it was performed.

Surgery and Obstetrics: The surgeons, of course, had started very early to have their operations recorded on film. In 1898 Eugene Louis Doyen, the controversial Parisian surgeon of great fame, set up a camera in his operating room and had himself filmed while performing various operations. Together with his first motion pictures, he presented a procedure for their classroom utilization.[8] To elucidate the principles of an operation, he first showed lantern slides with diagrams and with actual views, the latter derived from motion-picture frames, and then the film of the operation. But because of their highly personalized character —showing the figures of the surgeon and his assistants, and emphasizing virtuosity rather than detail— Doyen's films were widely attacked.

The character of surgical films changed gradually as the camera began to concentrate upon the operative field. In 1913 Henri Billet,[9] who taught surgery at the military medical school in Paris, related that his results with films had surpassed his expectations. At that time he used 20 films on major operations, 10 of which dealt with amputations. Most probably the films, averaging from three to five minutes, were those produced by the surgeon Auguste Broca. Billet's students saw the films twice, during the lecture and during the instruction period preceding laboratory practice.

A novel application of integrated film use was devised by V. Wallich[10] of the Sorbonne who in 1916 produced a series of shorts (from one to three minutes) demonstrating standard obstetrical maneuvers on the manikin. He made these films in the first place to obviate the need for demonstrating the same procedure over and over again to many small groups of students. They helped him to save a great deal of time and brought out details with greater clarity and precision. Each film was projected several times during a lesson to permit better observation and enable the teacher to explain a procedure from different aspects. The projector had a stop-frame device so that details could be studied with the film arrested. Apart from its advantages for the students, Wallich's method probably marked the first time motion pictures were employed as a partial substitute for the teacher's physical performance.

Between 1917 and 1921 there was another, then relatively recent application of the motion-picture medium in medicine. This was the production of a series of nine short films in animation by the noted German obstetrician Albert Döderlein. The series helped to visualize the spatial concepts pertaining to the mechanism of labor, presentation of the fetus, detachment of the placenta, and placenta previa.

Live action was used in another obstetrical series,[11] produced in 1919 at the Wertheim clinic in Vienna and consisting of 12 films of an average length of six minutes, which dealt with various phases of normal and abnormal labor, and several pathological conditions and operations. They were routinely used in the courses given at the Wertheim clinic.

Many Films, Few Users

By 1920 a considerable stock of

short subjects had accumulated (not all of them mentioned here), especially in neurology, microbiology and biology. A moderate number of surgical films attempted to bring out the principal steps of standard operations. There also were small blocks of subjects in other areas such as obstetrics and physiology. Many of these films dealt with basic and relatively timeless subject matter, and for this reason, as well as for their brevity, they were ideally suited to accompany lectures as motion picture illustrations or demonstrations.

That they were not much used in this fashion, save by their authors, was not due entirely to the conservatism of the medical profession, for there existed a remarkable number of influential film enthusiasts. The difficulties of film utilization may have been more decisive as a deterrent.

Paradoxically, distribution conditions were often theoretically excellent because many of the films had been produced with the assistance of the educational and scientific departments of large production companies with international distribution facilities. However, because of unsatisfactory channels of information, the existence of the films did not become widely known.

The greatest handicap was the rarity of film projectors owned by universities. And the strict safety regulations to which the use of 35 mm. films was subjected made their employment in the classroom often very difficult, if not impossible. Furthermore, costs of 35 mm. projection equipment, architectural adjustments to comply with fire laws, projectionist fees and film expenses probably were in most instances far too high to be met out of tight departmental budgets.

The Rise of Complex Film Types

While the basic short films gathered dust on the shelves of their producers, more articulate and comprehensive types of medical motion pictures were being evolved, particularly in the United States. Not only the emergence of more highly organized educational film patterns, but also the progress of film technology contributed to this development. More versatile cameras with larger film capacity, as well as improved accessory and lighting equipment facilitated film making and rendered it in turn more versatile. Thus, between 1915 and 1917 the Clinical Film Company of New York produced about 200 motion pictures, most of them in operative surgery, which as a rule ran for 15 minutes and longer. The massive production of training films during World War I also stimulated medical film making and helped to make its patterns more complex. As an example, among the many films produced or edited by the Medical Department of the U.S. Army was a 34-reel series designed to supplement methodically a 17-lesson course in orthopedics.

A graphic illustration of the gradual transition from the single-shot or single-item medical film to the systematic instructional film is provided by the motion-picture activities of Joseph F. Montague.[12] Beginning about 1916 Dr. Montague, a proctologist, made a film record of every interesting rectal case which passed through Bellevue Hospital in New York. After a few years he found himself with a great amount of unedited footage at hand. To make these views easier to use, he arranged them according to disease entities and provided them with descriptive titles. When this job was completed it was felt that the ma-

terial should be expanded to include therapy. Accordingly, motion pictures were taken of all the operations employed by rectal surgeons. After this footage had been incorporated it seemed that "some additional help in understanding the exact process of the technique" was necessary. "The answer to this was found in the employment of animated cartoons or diagrams. By preceding an actual showing of the surgical operations with an animated diagram of what was to take place, the ideal appears to have been found." Finally, drawings were made to elucidate the anatomical, histological, physiological and pathological details of the conditions before treatment. What had started as an accumulation of views of the clinical appearance of rectal diseases was now an elaborate film series dealing with all of their aspects.

Another factor spelling the doom of the short film was introduction of the 16 mm. film and its equipment in 1923. It took only a few years for a rapidly mounting number of physicians, above all in the United States, to acquire this marvelously simplified technique and to begin mass production of films, most of them made by specialists for specialists. Basic subjects became rarer and rarer and longer and longer. They tried either to cover all aspects of a subject or sometimes were merely compilations of related material. Furthermore, as medical sound films became more frequent from the middle 1930's the element of oral presentation was added. Since lecturers were in the habit of talking continuously for a longer period, the transference of this attitude to medical films constituted a psychological block against the concept of the short film.

In Europe, especially in Germany, the short medical film serving purposes of illustration or demonstration continued a subdued life during the 1920's and 1930's. Very few attempts were made with such films, however, to cover a given course or at least a portion of a course methodically. Most such films were by-products of laboratory or clinical investigation or originated in the availability of a motion picture camera rather than in distinct instructional concepts.

In summary, over the past 40 years a fair number of single-item films have been produced in many countries. Some of this material was of basic and some of specialist significance, yet altogether it was much too scattered to stimulate its routine use as an integrated lecture tool.

The Forgotten Short-Film Pattern

In the United States, paradoxically enough, the concept of producing and employing short integratable motion pictures fell into almost complete oblivion just when the increasing availability of 16 mm. projection equipment could have made its wider application feasible. Hardly any indication of short film use can be found in film lists and in the literature. Perhaps the only exception is a series of some 25 films, ranging from four to 12 minutes and demonstrating the standard animal experiments of drug actions, which were produced by Torald Sollmann of Western Reserve University Medical School in the early 1940's. Compilations of illustrative material were attempted by others, sometimes in very long films which could hardly be assimilated when projected in toto. For example, "The Dynamics of Respiration,"[13] produced in 1938 by W. H. Cassels of the University of Wisconsin Medical School, showed in 43

minutes some 20 patients with impaired breathing due to different pathology. It may be wondered whether any teacher ever used this film in sections as lecture illustrations.

The lack of experience in designing and using motion pictures for illustrative purposes led sometimes to a structuring of material that counteracted its teaching potential. About 1936-1942, Gordon B. Myers and associates, of Wayne University medical school, produced "Physical Diagnosis,"[13] a series of 17 reels which showed some 400 to 500 visible physical signs found in advanced and unusual cases. A good proportion of these signs was static, and therefore did not require motion pictures. Yet the material presented was of fundamental importance and of high medical interest. However, its effectiveness was weakened by several factors. Many of the signs were impressively presented, but others suffered from weaknesses of photography, camera positioning, continuity and timing, which made their identification and absorption difficult. These shortcomings, incidentally, indicate that the effective presentation of even seemingly simple objects requires competent motion-picture skills. Some of these reels may be compared with attendance at a clinic where 25 patients were presented within 15 minutes, with from 15 to 30 seconds allotted for studying an individual sign. While such brevity had been favorably regarded by Weisenburg, he had shown each sign in several patients so that it could be remembered better; here, however, most signs were seen only once. Moreover, in most reels there was a constant change of pathology, for the signs were arranged according to their topography (head, neck, etc.). This arrangement also excluded the use of these films as illustrative material for systematic basic courses. If the views of signs requiring more time for observation or interpretation had been printed several times in succession (or, even better, had been filmed in a more analytic fashion) the films would have been more effective; and if, in addition to the topographic arrangement, the signs were broken down according to identical or related pathology, the material could have been used by teachers in a more flexible way for the illustration of their classroom lectures.

A purely additive structure of illustrative material also has occurred in the motion pictures produced by Paul H. Holinger during the past six or seven years, which consist of endoscopic views, often correlated with x-rays, of lesions of the larynx, tracheobronchial tree and esophagus.[14] These films have been compared to atlases; but unlike the illustrations in an atlas, the views in Holinger's films do not provide time for extended study during projection, nor can they conveniently be looked up individually or out of sequence. This difference is also important because these endoscopic views lack orientational devices such as arrows, labels and diagrammatic outlines, wherefore they are often difficult to understand by the untrained. Actually, Holinger's films are collections of case presentations representative in their own right, but fully assimilable only on the specialist level. Nonspecialist medical groups would need differently selected and interpreted material.

New Approaches

A different type of short film has been developed during the past few

years by Hilger P. Jenkins in his growing series on surgical pathology.[15] Each reel is a collection of a few cases representing related pathological conditions in one organ, which are demonstrated, and visually correlated with x-rays, on the operating table and in the specimen. Although these sharply defined films have been intended as motion-picture supplements for clinical conferences, they are perhaps more in the nature of basic material around which to build a conference.

Motion pictures such as those by Myers, Holinger and Jenkins were intended by their authors to be used in the form in which they were released. Nevertheless, common to these and other films is that they consist of small, self-contained units, each of which can be utilized for instructional purposes different from the one represented by the original version of the total film. For example, many of the cases depicted in Jenkins' films could be used individually to illustrate the surgical pathology of a specific condition in one organ. Or edited excerpts from several of Jenkins' films, perhaps together with excerpts from films by other authors, could be arranged as illustrative material for lectures on the pathological manifestations of one disease in several organs.

These examples point to the possibilities of creating short units by excerpting existing films, a method which, though rather obvious, appears to have been used routinely by only a few medical teachers, such as Milford E. Barnes of Iowa State University College of Medicine.[16] Likewise, excerpts edited from long films have been placed into general distribution in a few instances only, such as "Scabies Mite"[17] (seven minutes), from the comprehensive British teaching film "Scabies," or "Sewage Treatment,"[18] an animation sequence from General Electric's "Clean Waters." Such excerpting of long films[15] evidently has important teaching applications.

As a reaction to the prevalence of ill-defined and complex long films, in recent years there have been attempts to seek a theoretical basis for the short, self-contained type of motion picture, which can be used by any teacher as basic instructional material on a given subject. In 1946 the British specialist in visual education, G. Patrick Meredith,[19] applied his general concepts of the functions of the various educational film types to medical instruction. He placed major emphasis on the need for producing an adequate supply of "sentence films," which were to cover those aspects of the courses of study that could be implemented by motion pictures. Such "sentence films," a term used in analogy to a verbal sentence, he defined as "short visual statements showing unitary medical facts and phenomena: reflexes, gestures, operative actions, physiological processes, the functioning of apparatus, and so on.

"We shall then have a basic kinematic library of short films," he continued, "perhaps three minutes or less, comparable to a collection of lantern slides. Teachers would not feel that a prefabricated lesson by a stranger was being imposed on them, but merely that they were adding a new dimension to their lantern slides."

The dominance of the conventional production formulas so far has prevented a full-scale test of such short films. In medicine, only a relatively small number has been attempted during the past few years. Among them were 11 units made by Ruhe

and associates at the Communicable Disease Center, Public Health Service, in 1947-48.[18] Most of these two to seven-minute shorts reproduced details of the life cycle of parasites and their vectors. They were intended partly as supplements to more general films, and partly as a substitute for the microscopic examination where living specimens were not available. Among recent British short films[17] were neurological and pediatric case demonstrations produced by St. Mary's Hospital Medical School, and by Ronald MacKeith, of Guy's Hospital Medical School. Peter Hansell's "Examination of Cervical Lymph Nodes"[20] is a good example of a well-conceived teaching short film. One of Jenkins' films contains a brief independent section depicting the experimental formation of an adhesion band strangulation. He now is giving attention to the production of short units, as evidenced by a recent showing of footage for a unit depicting the mechanical effects of gastric hemorrhage, and as he has stated at the 1952 annual meeting[41] of the American College of Surgeons.

An encouraging sign is the awakening interest of American film producers in educational motion pictures shorter than the standard one-reel length. In 1939 F. S. Wythe issued his four-minute "Filmsets" in geography[21] for elementary grades. Encyclopedia Britannica Films[42] has put out two sets of six loop films each, on first aid and electricity, called "filmettes." These have not proved to be too successful, however, possibly because of weaknesses of the material, which had been derived from existing films rather than developed for this purpose. Moreover, there seems to have been teacher resistance against operating the unfamiliar loop-film attachment to the projector. The Text-Film Department of the McGraw-Hill Book Company[43] has released a series of four- to seven-minute films on college physics, each unit explaining graphically and concisely a law, concept, or method, such as the Doppler effect, uniform circular motion or measurement of the speed of light. The more precise application of loop-film techniques to the learning of motor skills and languages is now being explored by various producing groups. In Britain, Hill has described the exploratory use of sound film loops in industrial training.[22]

All this constitutes a slowly growing trend in medicine and other areas toward an unwitting resumption of the pattern of the pioneers. Yet what was then the product of a nascent technique is now deliberate limitation, derived from a wealth of motion-picture and educational experience. Even then short films will be only one of several essential types, each serving a specific function.

Summary

More than 50 years ago short motion pictures were the first product of a great new discovery which could be applied to medical teaching and research. In five decades, under the impact of great technological progress in production and utilization, films in medicine have become longer, more complex, more imitative of verbal forms and conventions of teaching. They have become less and less clearly related to their early functions of communicating some truth about phenomena in motion, until the circle has begun to swing toward the full. Today short films are being thoughtfully designed by more educators and producers, including those in medicine, for specific classroom teaching.

Short Films for Cancer Teaching in the Medical School

Report of a Study in Progress*

Aspects of Production

DAVID S. RUHE, V. F. BAZILAUSKAS, NORMAN P. SCHENKER

IN THE FALL of 1951 the Medical Audio-Visual Institute had completed a detailed study of films for cancer teaching in the medical schools, under a grant from the National Cancer Institute, Public Health Service.[23] The reviews covered more than 40 currently available American motion pictures concerned wth aspects of oncology. When these reviews were added to the many other Institute studies on the critical cataloging of medical films,[24] there was strong evidence that unique collections of only partially utilized film materials lay in various medical centers across the land.

The cancer coordinators of the medical schools and the staff of the National Cancer Institute have shared with the Association of American Medical Colleges the conviction that the work heretofore achieved in cancer teaching with films was not adequately reaching medical students. Even the praiseworthy joint effort of the Cancer Institute with the American Cancer Society to produce a series of professional teaching films for the practicing medical profession[25] did not meet the needs of the medical school classroom. From the reviews of cancer film there appeared to be reason to suppose that greatly improved instruction might be achieved, with the experimental mobilization of short films for cancer teaching from the pools of film known to be available if as yet unassayed. The production, distribution and utilization of a block of short films was given support both by the Cancer Institute and the cancer coordinators. Work was begun in December 1951, on the assumption that attention would be devoted primarily to excerptation of existing films, mobilization of research film stocks known to exist in the hands of investigators who were using the camera in their studies, plus the new production of such units as would appear to be necessary.

General Plan of the Project

The project, as formulated for ex-

*A partial report of work accomplished under a grant from the National Cancer Institute, Public Health Service, Federal Security Agency, for the "Study, Production and Experimental Utilization of Short Motion Pictures for the Teaching of Fundamental Oncology in the Medical Schools."

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ploration, anticipated a number of phases. The *Phase of Search* would precede the *Phase of Planning for Production,* for then the existing film materials would be known and priorities could be established. The *Phase of Production* would carry through all necessary steps for procurement of film materials, excerptation and modification, and new shooting if called for. The *Phase of Distribution* would include setting up the mechanics of film purchase and loan. The *Phase of Utilization* would comprise classroom trials with selected cancer coordinators in medical schools. Only the first three phases are reported upon in this paper.

The Search for Useful Film Materials

The reviews of cancer films proved to be a valuable direction finder and guide to sources of possible excerpts. Collections of unique and potentially utilizable film were indicated to exist in the endoscopic cinematography of the food and air passages of Paul H. Holinger[14] and Louis H. Clerf; in the cineradiographic research footage of George H. Ramsey, J. S. Watson Jr., and Sidney Weinberg,[25] and of Rudolf Janker[26] in Bonn; in the cinemicrography of cancer cells in tissue culture, primarily of Wilton Earle, George O. Gey, Warren H. Lewis[27] and others; and in the footage on surgical pathology deriving from a multitude of scattered sources but notably from Hilger P. Jenkins.[15] It showed further that the professional films of the National Cancer Institute and American Cancer Society series on early cancer diagnosis lent themselves to excerptation.[28] Other worthwhile film stocks were known to exist abroad in Britain and Switzerland if they could be surveyed. And it was expected that unsuspected worthy films would come to light with methodical pursuit of all leads.

In March and April of 1952 Norman P. Schenker found it possible to explore certain film sources in London, England; Geneva, Switzerland; and Bonn, Germany, as a portion of a business trip to Europe. His search exposed useful film material and widened the project's implications to its proper international scope.

The phase of search was wasteful of time and effort. Large volumes of low priority film footage were viewed. Large volumes of qualitatively unacceptable footage were screened. However, viewing of films quickly made plain that a number of different production methods were demanded:

1. Direct excerptation without modification in a very few cases;
2. Direct excerptation, with title and narrational alteration, in a few cases;
3. Excerptation with recombination or modification, such modification ranging from insertion of simple orienting diagrams to complicated reconstruction of film sequences; such procedure was apparently necessary in a majority of the films;
4. New production as determined by priority needs in the over-all project.

Planning for Excerptation and New Production

In February 1952, the coordinators of cancer teaching in the medical schools named an Audio-Visual Committee to assist the project staff in determining priorities, to supply specialist medical advice and to help in the planning and prosecution of classroom trials as soon as enough short films were completed. Thomas P. Almy, Cornell; Theodore Eberhard, Jefferson; and Walter Mersheimer,

New York Medical College, comprised the committee.

At their first meeting the committee made it clear that short films on facts and skills in cancer *diagnosis* had first priority for production, and that surgical pathology or basic cancer biology, such as cinemicrography of tissue cultures, were of second priority. The Institute staff, however, assigned an equal first priority to the development of films required for the exploration of short film types, regardless of the priority of their subject matter.

At the second meeting of the committee in May, several months after wide and methodical search up to the limits of project resources had shown what might be available, the blocks of films to be assembled for test utilization were tentatively set as being concerned primarily with diagnosis of cancer of the rectum and of the air and food passages; secondly with the cervix, breast and stomach. A number of films in several important subject matter areas were to be produced in order to suggest extensive further production; that is, series on methods of biopsy, on physical examination by inspection and palpation, on routes of lymphatic drainage and patterns of metastasis.

Production Problems and Solutions

Actual production work was divided evenly between the two production consultants: V. F. Bazilauskas and Norman P. Schenker. Film material was collected for whatever manipulation was required. The interest and cooperation of many collaborators was enlisted and maintained. Methods were devised for handling and safeguarding valuable original films. For Kodachrome, particular caution was taken to obtain adequate duplicate masters, since the failures of quality in second generation kodachrome prints are notorious. Facilities and services for editing, projection, new shooting, animation, diagrams and titles, opticals et al., were arranged. Dr. Bazilauskas was able to work in New York City at Memorial Hospital with Drs. Almy and Robbins of the Cornell group and with the American Cancer Society. Dr. Schenker worked afield with Drs. Holinger, Illinois; Clerf, Jefferson; Ramsey, Rochester; Janker, Bonn; Brunner, Zurich; and de Watteville, Geneva.

An early discovery during the phase of production was that the project's films could be anticipated to run more than twice the length of total fine-edited footage estimated originally. This meant a significant increase in work and costs. It was realized later that a far greater proportion of units required really extensive revision and new production than had been anticipated if they were to fit the criteria and needs of the project. This was true even though the short films resulting were still simple and straight-forward productions for teaching.

In most cases the problems of footage modification were discovered to be concerned with the production and introduction of simple orientational or transitional footage. Editing also was necessary to clarify and complete film material which otherwise was fragmented and difficult for students to understand.

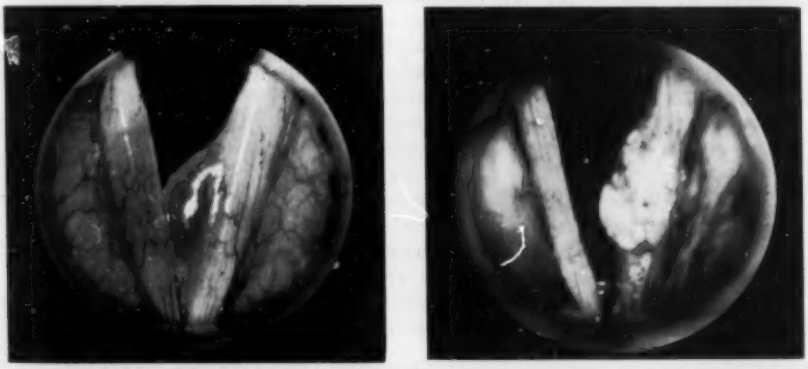
Optical and Magnetic Sound. Titles and Verbal Data: The possibility that each short film might require new titles and a specific new narration provoked additional problems. In a number of units it was decided to prepare new narrations for optical sound tracks, which the teacher could use if he wished. Certain of the direct

excerpt films of course already were supplied with sound, available for optional use. Most of the final films were to be given blank magnetic sound tracks, for the express purpose of permitting the recording of personalized narratives by each individual teacher.[20] For a few films it was decided to print special labels which, glued to the inside of the film can, would provide sufficient data for ad lib remarks by the instructor as the film was projected, or which would permit such understanding of the film content as conceived by the film's makers, that an instructor could more wisely dictate a personalized narration onto a magnetic stripe which he might choose to apply to the film. Finally, since even with an optical sound track and titles it might be desirable to supply additional data, as in details supporting a film record of a cancer case, thought was given to the possibility that such material could be placed, as if on microfilm, upon the film leader where the instructor could read it, but not project it to his classes.

Psychological Obstacles to Production of Short Films: From the outset, although the reaction of collaborators was enthusiastic and the support of the cancer coordinators excellent insofar as it was requested, the concept of the simple short film encountered subtle obstacles based upon the authors' own psychological acceptance of current medical film conventions of thought. In brief, these tacit conventions consist of three conceptions:

1. That films should be self-contained and capable of standing on their own feet if need be;
2. That they should have an introduction and conclusion, and
3. That production skills should be of that high caliber which is based upon standards deriving from the most expensive sponsored or Hollywood products.

The obstacles existed in the minds of the project team as well as in those of the collaborators. Several of the project films themselves answer these very conventions. Yet it was a healthy aspect of the project that the experienced producer-consultants at first had difficulty in accepting fully the different concept of the short films, but slowly evolved a different



ENDOSCOPIC view of sessile polyp, left vocal cord (left); early carcinoma of the vocal cord (right). *(Paul H. Holinger.)*

philosophy of production based upon the demands and limitations of this film type. It will remain for the test group of cancer coordinators to evolve similarly a program of effective classroom utilization based upon the philosophy of "slides-in-motion" rather than upon self-sufficient "teaching films" designed for the very different setting of the postgraduate seminar. It may be predicted that the same psychological obstacle of accepting a new concept will be recognizable for a considerable period.

Films Developed During the Project: The films produced, either finished or in process of completion under the continuation grant,* must be classified in two ways:

1. As films representing different types and approaches to the concept of short teaching films, and

2. As groups of films or individual films representing cancer teaching subject matter.

From the standpoint of instituting a fundamental change in the practices of medical film production, the former group is more vital. However, from the standpoint of subsequent experiments in classroom cancer teaching, where successful results will create conviction of the value and practicability of short films, the latter group is more important. It is worthwhile to emphasize again that the project experiment is composed of both classifications with, of course, a wide overlapping.

Titles of Project Films: Titles of the 29 present project films, either now completed or in some final stage of development, are grouped by organ systems. Such a grouping indicates the blocks of film units which will be available for teaching experiments.

A. Gastro-Intestinal Tract: Anus, Rectum, Sigmoid (and Prostate)

1. Principles of Digital Rectal Examination
2. Digital Rectal Examination Techniques: Female
3. Digital Rectal Touch Picture: Male
4. Principles of Prostatic Massage
5. Technique of Prostatic Massage
6. Principles of Proctosigmoidoscopy
7. Proctosigmoidoscopy
8. Technique of Rectal Biopsy

B. Female Breast

1. Embryology of the Breast
2. The Technique of Breast Examination
3. The Technique of Examination of the Pendulous Breast
4. The Technique of Post-Operative Breast Examination following Radical Mastectomy (I)
5. The Technique of Post-Operative Breast Examination following Radical Mastectomy (II)
6. The Signs and Clinical Pathology of Moderately Advanced Breast Cancer
7. The Technique of Aspiration Biopsy of the Breast

C. The Food and Air Passages: Esophagus, Epiglottis, Larynx, Trachea, Bronchi and Lungs

1. Carcinomas of the Esophagus Invading the Trachea
2. Carcinoma of the Esophagus: Cinefluorography of Advanced Cases
3. Pulmonary Metastases of a Sarcoma, with Bilateral Spontaneous Pneumothorax (Loop)
4. Cysts and Polyps of the Vocal Cords, Laryngoscopic Observations
5. Vocal Nodes and Contact Ulcers, Laryngoscopic Observations

D. Miscellaneous

1. The Lymphatic Metastasis of a Seminoma
2. Tumor of the Thigh (Loop)
3. Hemangioma of the Brain (Loop)
4. The Technique of Wedge Biopsy
5. The Technique of Excision Biopsy
6. The Technique of Abdominal Palpation
7. The Technique of Mouth Inspection
8. The Technique of Mouth Palpation
9. The Diagnosis of Gastric Cancer
   a. Gastric Analysis
   b. Hemoglobin Analysis
   c. Guaiac Test
   d. Proctosigmoidoscopy
   e. Gastroscopy

An Analysis and Discussion of Short Films Following Production

When many short films are actually

*The National Cancer Institute has granted support for an additional year of trial development, to November 1953.

ANIMATION from "Rectal Digital 'Touch' Picture," experimental short film on rectal palpation. *(Bazilauskas.)*

put into production, some new factors of course come to light. The nature of the subject matter, the nature of the film medium and the limitations of actual classroom projection raise real issues for solution. The films are quickly observed to range from very simple and brief slides-in-motion (in all literalness) to complex units whose qualifications for the project criteria reside solely in their function rather than in their considerable length. Similarly, film skills demanded for acceptability of the end products were seen to range from the most simple and straightforward camera usage to the most complex and demanding combinations of scientific filmcraft.

Illustrational Films—Simplest of Short Films: Most elementary of all short films is the scientific illustrational film. Such films are represented by three loop films. In loop films some repetitive movement, often cyclic, is selected for film analysis or teaching. Each film is generally a single illustrational shot or, at the most, several related shots with or without diagrams or added material. Two ways are possible for repetitive projection of the same film segment:

1. The beginning of the film piece is spliced to its end, mouth to tail, to form a loop, then it is threaded through a projector with or without the aid of some loop-controlling device. This is a true loop.

2. The selected film piece may be printed over and over in the printing machine until as many repetitions as are wanted exist in tandem on the final strip of film. This false loop may serve essentially the same purpose and is based on the same basic idea of film utilization.

In this series, films of the true loop variety are "Tumor of the Thigh," "Hemangioma of the Brain," and "Pulmonary Metastases of Sarcoma." It should be stated that the subject matter of these rare cancer cases is purely incidental to the loop film demonstration. Ramsey, Watson and Weinberg have used loop films with success in their own teaching.[44]

Demonstrational Films: From the simplest one-shot film made into a loop, the short teaching films steadily expand in complexity. Simple procedural films of two to three minutes, such as "Technique of Rectal Biopsy" or "Technique of Skin Biopsy," are self-contained in a sense, but are

more the equivalent of a long sequence in a conventional medical film. Similarly, "Principles of Digital Rectal Examination" and "Principles of Proctosigmoidoscopy" are simple demonstrations of procedures as performed on a model. "Lymphatic Metastasis of a Seminoma" and "Carcinomas of the Esophagus Invading the Trachea" are similar in length, but are simple composites of footage from several sources demonstrating two types of carcinomatous spread.

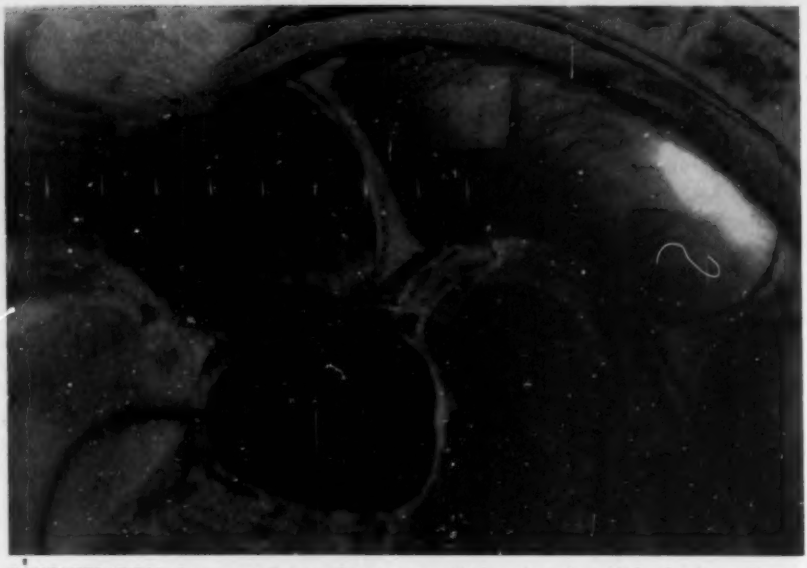
From films of this order, the range of "short" films pushes up toward its arbitrary tentative maximum of one reel, or 11 minutes, or one-fifth of a teaching period. Such films are "Proctosigmoidoscopy" and the direct excerpts from the Cancer Diagnosis Series: "The Signs and Clinical Pathology of Moderately Advanced Breast Cancer," "The Technique of Breast Examination" and "Embryology of the Breast."

Short Films within Short Films: Many of the longer films lend themselves to subdivision in their turn, if re—editing[30] appears to be desirable to individual instructors. "Cysts and Polyps of the Vocal Cords" is a short case atlas film and provides a range of case shots; but individual shots are "slides-in-motion" by themselves. Similarly, the "Digital Rectal Technique: Female" shows the procedure performed in three positions on the subject, one or two of which may readily be deleted or recombined with other footage.

Film Brevity and Classroom Projection: It is not yet clear, pending extensive classroom trials, what "short" will mean in practical terms of classroom use. It is possible that there is a minimum length (perhaps two minutes) below which the mechanics of projection and room dimout will literally prohibit use of single shorts. Conversely, it is quite possible that even a 10-minute film may be objected to by many instructors, particularly since added length increases the likelihood that material emotionally or intellectually objectionable to the individual instructor may be included. Further, it is likely that functional classification of the short film will develop during the process of utilization, and that this will in turn influence the production of new shorts.

Subject Matter Areas for Cancer Teaching: The list of film shorts in production indicates that an approach toward reasonably comprehensive coverage of cancer diagnostic needs is under way for the rectum, breast, stomach, and air and food passages. Obviously a large number of possible units can still be fabricated before a complete basic film library of shorts has been assembled for any of the four. Much material is at hand and in some cases is available partly processed. This is true notably in the footage available on the air and food passages and in certain cineradiographic footage. Certain units, such as "The Signs and Clinical Pathology of Moderately Advanced Breast Cancer" and "Embryology of the Breast," have been produced only to demonstrate how to edit existing films. Others such as "Technique of Examination of the Pendulous Breast" are designed to round out groups of film shorts.

To indicate cancer diagnostic series which require initiation, a few simple units have been done. A potential series on biopsy is represented by "Technique of Aspiration Biopsy of the Breast," "Technique of Skin Biopsy" and "Technique of Excision Biopsy." A potential series on palpation is represented by the rectal digital series, by the breast examina-



DEMONSTRATION of passage of sigmoidoscope in sagittal section of model (male) from "Proctosigmoidoscopy." *(Bazilauskas.)*

tion group, by abdominal palpation and by the single experimental touch picture. A series on inspection is suggested by "Technique of Mouth Inspection." A series on lymphatic spread of cancers is suggested by "Lymphatic Metatasis of a Seminoma." A series in cineradiographic diagnosis is suggested by the loop films, and by the two films on carcinomas of the esophagus. The special illumination of endoscopy of hollow organs is indicated by the splendid Holinger and Clerf footage.

Special Considerations in Short Teaching Films—Sound and Narration: In evaluations of motion pictures with sound, the narration frequently is the principal target of criticism. Notwithstanding the justice of many criticisms, the sound track carries the thought of the author, however much others may disagree. And the narration usually describes items seen in the film as only an expert can know them. That the sound track is not a mortal enemy of classroom film use is easily demonstrated. The first and easiest solution, well adapted to the "slides-in-motion" concept, is for the teacher to switch off the sound and ad lib with the film, just as he would discuss a slide. Another alternative is to add a blank magnetic sound stripe to the optical track,[29] so that the individual teacher may dictate his own narration just as he sees fit, down to the last small nicety of phrase. A third possibility is to switch back and forth from optical to magnetic track. The test group of short films have been given blank magnetic iron stripes for the individual use of the several coordinators participating in the classroom test program.

Titles: The problems of accurate and exact film titles for easy and effective cataloging have not been precisely solved with these first short films. Certainly, however, if a deluge of short films are made in the near future, it would be helpful to have simple procedures for titling so that cataloging would be accurate without being misleading. An attempt has been made to title each film in such a way as to permit easier card reference by the Library of Congress.[31]

Reels and Cans: Films shorter than 400 feet pose mechanical problems of handling and storage. Two-hundred-foot reels and cans are now coming into more common use. This innovation applied to short medical films is designed to improve storage problems and to reduce costs. It may be essential to develop 100-foot reels and cans for shorter units, as well as special containers for loops.

Personnel: The experiences of short films production thus far in the project, when coupled with the long term experience of the project group, permits some observations of the types and potentials of personnel who may effectively produce satisfactory short films.

First, it is clear that supervisory professionals of audiovisual education are necessary. Without them the film skills which are one criterion of success are not sufficiently brought into play. Amateurs habitually will not concede the emotional and esthetic necessity for proficient film practices, particularly in their own films. And even the simplest orientational and pointing devices take an order of knowledge and detailed skill of which the film amateur does not dream, and certainly rarely faces as a reality. In particular, the pitfalls of work in kodachrome are blithely ignored by amateurs; the great shortcomings of laboratory methods, color opticals, true color rendition et al. are hardly realized by the film-maker whose experience is limited to originals from his own camera, which appear and often are satisfactory for primary projection, but are sorry masters for a family of daughter prints. The problems of the simplest animation processes are the domain of the professional. The whole complicated process of guiding a film from ideas or raw film masses to a good release print requires an order of skill and craftmanship which require case-hardened professionals.

Second, it also is clear that the amateur film-makers—the scientists, surgeons, clinical photographers (who are generally film amateurs except in the handling of lighting and camera), and cameramen of all vintages —have a greater potential role than it was possible to develop in this project. In our paper on the implications of short films, we have elaborated on the training of the amateur film makers by the professionals, so that they may become intelligent and even inspired collaborators. The effective training of the scientists and their staffs, within the time and interest limitations which bind investigators, would do several things. First, it would reduce the wasteful and inefficient travel expenditures which are necessary under the terms of excerptation by a professional, as was true with Dr. Schenker. Second, it would assure more thoughtful collection of new footage more suitable for the special purposes of teaching. Third, it surely would bring to light new scientific material and knowledge,[32] since the advent of a new discipline of thought inevitably sheds new light on a problem of medicine. And last, it would discover new and talented persons in these

research laboratories: residents, laboratory technicians and others whose latent skills would come to light with the stimulus of planned collection of teaching film footage.

Third, the auxiliary film personnel who work with the production groups require a greater orientation to medicine's special needs. The animators, film laboratory personnel, professional cameramen, illustrators, sculptors, engineers and others who may from time to time be required would gain greatly from simple orientations to the science, cinematography and teaching involved. This is, of course, a pipe dream except in large and sustained projects, of which historically there have been very few.

And finally, the sponsors and administrators should receive short courses in the complexity of production problems which, in the end, deliver delightfully simple and direct products for teaching. It would be helpful if sponsors clearly recognized both the process of production and the intangibles of production, but especially the time and toil of production of the simplest motion picture, which is the price of the mass medium.

Costs: It is not yet possible to estimate the real costs of short film production for later purposes of rule-of-thumb computation. In light of the differing types of films producible, it is not certain that this ever would be accurately estimateable in advance. However, several factors concerned with real costs of production can be raised for the guidance of those who contemplate production of batches of short medical films.

1. VISIBLE COSTS: Visible costs are those which the sponsor or financial source pays and which appear on the books as part of the project. They include the salaries of the professional personnel, travel, rental of equipment and purchase of materials, plus the clerical, fiscal and general costs of any operation.

2. INVISIBLE COSTS: It is customary to skip over the equally real, if invisible, costs of the time of researchers, their staff, the facilities being used by them, the materials, equipment and operational overhead which are more or less casually assumed as part of another working operation usually called a university department. In a short project based on excerptation and modification of film produced as a part of research (Ramsey and Janker, for example), or as a by-product of clinical practice (Holinger, for example) with research and teaching having perhaps equal considerations, the intrinsic monetary value is quite large for the films which are converted for special teaching purposes.

In general, such value is only potential, for it is not until it has been altered by the production process that it gains true teaching currency. This means additional invisible investment of time and effort by the scientist-cameramen.

3. CUTTING COSTS. To reduce the visible and invisible costs alike, sources of wastage must be examined. More efficient methods of obtaining acceptable films must be devised. Several alternatives are suggested.

One common experience of all professionals of motion picture production, who set out with a plan to produce a specific film message, is that their review of thousands of feet of research footage often turns up little that answers professional criteria of acceptability. Thus they must begin from scratch, or may be forced to use film footage which may appear to be good to its maker but which does not fit the standards of a mass medium.

There is no way to halt the unremitting search for the rare, the splendid shot, the one-in-a-million occurrence recorded on film. Such shots may make a film memorable beyond forgetting. On the other hand, it may be better for the scientist or one of his staff, who may be an underpaid resident, to do the searching, than for the visibly expensive film professional who in any event will require a long indoctrination time before he is as knowledgeable as the scientist. Training of the scientist and his staff to visualize in advance their teaching message may succeed in transferring the burden, costs and rewards to their shoulders.

Where a long series of short films is possible, and where the situation is fruitful, as with Ramsey's group at Rochester or with Holinger at Illinois, the methodical training of their staffs in production procedures may be warranted. The selection, training and part payment of an interested and capable resident or technician, along with adequate and thorough preparation of storyboards for projected short units, can substitute less expensive personnel time for the more expensive personnel time of the film professional. Further, it can reduce the costs of a prolonged period of work away from home by the film pro by substituting the efficiencies of work at home by the trainee. The great human hazard is that the trainee who is given a short course in film management and production is very likely to forget that he is years away from true film proficiency. And his supervisory superiors, whose viewpoint is rarely that of the educator seeking to produce materials satisfactory for teachers the world around, are very likely to believe that essentially amateurish results are good enough.

Although the coming of color television [33-34] is likely to completely destroy the acceptability of black and white film just as sound film destroyed its silent predecessor, there is a cost consideration in selection of color versus black and white in production. If black and white film is the sensible selection for production, as in cineradiography or certain cinemicrography, it should be recalled that this decision is a great gain in film processing problems and reduces the costs of the ultimate prints by more than one-half.

Finally, it is clear that total production costs were low for the number of films produced in the project.

Distribution and Utilization

Problems of distribution and utilization of short films are complex and involve considerations and conclusions not included in this paper. Both projects are under study, and will be discussed in later publications.

Conclusions

1. Approximately 30 short films of varying length, content and derivation have been made or are in the process of completion preliminary to classroom testing. These films have been developed to test the assumption that short "slide-in-motion" films will better answer the emotional and intellectual needs of individualistic medical school instructors than do conventional long "teaching films."

2. The short films represent a range of different film approaches, some of which are experimental. They include five subject matter areas where considerable numbers of units have been collected: rectum, food and air passages, breast, uterus and stomach. A miscellaneous film group has been produced to suggest

avenues for expanded short film production; the subject matter areas include physical diagnosis by inspection and palpation, methods of biopsy and lymphatic routes of metastasis.

3. In the process of search, planning and production, problems in the production of these short films have been encountered. Preliminary observations are made regarding many considerations of production of this genus of medical motion picture.

4. The entire group are, in a sense, "trial films," awaiting observations of distribution problems and methods, cost problems in purchase and tests of classroom utilization.

The Implications of Short Films in the Medical School

Film Production, Distribution and Utilization

DAVID S. RUHE

IT IS PREMATURE to do other than sketch broadly the possible implications of the concept of short films for the medical college classroom. There is, however, the need for a large-scale productional experiment, carried out by many hands in many different places during the next five years. These implications, therefore, should be stated. It is the purpose of this brief analysis to sketch the tentative conclusions which derive from historical perspective on the one hand, and from project progress on the other.

Short Films and Medical School Production

The detailed discussion of production on previous pages makes clear that short films can and do raise all the filmcraft problems of their longer formalized fellows, and some new ones to boot. In brief, it takes film skill to make truly satisfactory films, short or long. Yet short films are probably the proper way for the individual to begin motion picture making for his classroom purposes.

This is the era of the common availability of motion pictures with sound and color. Cameras, film and magnetic tape-on-film are not cheap, but they are freely accessible and of good quality. For the instructor in medicine, the way to begin to make motion pictures is with short units. Beginners should be cautious and have respect for the values and limitations of the medium and the need for the teamwork of scientist, photographer and illustrator. The short film is a microcosm of all film making. But short film failures are of small loss, while successes can always earn their keep in the classroom.

The medical school is a very complex organism of complicated and fiercely independent people. The individual enthusiast can join with the clinical photographer and medical illustrator to make simple, terse, pragmatic films which will serve his personal or departmental needs. These can be accumulated like a slide collection. The long teaching film has been the common failure of almost every medical school producer. Conversely, the short film is probably the natural target for the amateur in the medical center.

This invitation to an excess of camera indulgence must be coupled with a stern warning. Disciplined approaches to motion picture making are needed. Without simple controls, much time and money will be wasted

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in the name of experience. Some simple and old principles of motion picture production should be reiterated.

The most important single precaution necessary to successful amateur short film production is adequate planning through *visualization of every shot* in its relation to all others *before shooting*. When these visualizations are a series of still sketches, however crude, they are called storyboards, from a phrase of Walt Disney's. Words are never a substitute for pictures in this planning.

Next most important is planning for good *visual orientation*—the process of making sure *by visual means* that the student always knows where he is in time and place. Titles and narration made afterward are never adequate.

Third, the precise registry of film with diagrams or animation, the making of pointing devices such as arrows, the use of the camera itself as a pointing device, the preparation of titles, effects (if called for), optical and magnetic narration must be learned the hard way of experience.

Fourth, the discipline of editing is a special learning process unique to the motion picture language. TV kinescopes,[34] when they come, will be another exercise in editing, another experience in a type of film fabrication.

All of these, repeated again and again with thoughtful analysis of mistakes, in time transform a film exposer to a true motion picture maker. Music is, of course, superfluous in short films.

Training courses and workshops in the simple and not so simple methods and approaches of motion picture production are a prime necessity for all who would begin the learning process needed for building a library of short films.

Distribution

Short films are designed for possession after purchase. The very idea of personal adoption of short films and of buying and editing[30] to fit individual needs clearly means purchase. On the one hand, the costs of cataloging, shipping and handling become prohibitive of departmental time and money when many films are used. Conversely, where many timeless[35] films are bought, purchase is cheaper than loan through amortization over years of use.

Purchase, of course, means departmental budget items. Quite possibly it means the first coming of an honest market for basic film tools of teaching. With the coming of a market, sound commercial distribution may be feasible. Fair market prices for films will bring a return to producers and distributors. Some small income will accrue to laboratories and individuals for their motion picture teaching efforts, just as a scientist receives an income from his textbook. An economic incentive will be added to the educational, scientific and personal incentives heretofore operative. Ultimately, perhaps, there may be a volume of production-for-teaching rather than production for public relations or advertising.

Purchase of short films by individuals and departments will mean the establishment of highly personalized libraries, just as more or less extensive slide libraries have arisen almost universally in medical school departments. Development of these libraries of shorts will mean new requirements for film storage, new precautions for maintaining the identification of edited film pieces, new cataloging problems for the faculty audiovisual coordinator who may find it desirable to keep an inventory of

materials held by his faculty group.

Utilization

The Buy and Apply principle means that every interested faculty member will have the fun of learning the simple disciplines of film assembly by editing, since he will of course wish to shuffle and reshuffle his changing armamentarium of film shorts as he moves toward optimum saturation of his course with effective visual teaching tools.

Magnetic sound-on-film will doubtless be widely used for personal narrations. Magnetic sound recorder-projectors will probably early become standard equipment for the devoted user of short films.

Classrooms and laboratories will have to be modified for easy film use when large numbers of good shorts arrive in the market. Dimout rather than blackout will become the rule, for with shorts the very process of altering the lighting may be too wasteful of time; and learning by motion picture will as certainly require note-taking as do other forms of teaching. Student projectionists [36] may be necessary to fortify the instructor's personalized projection.

In planned closed-circuit television, as in the University of Kansas experiments,[34] short films may well be grist for these programs. Some projection, therefore, may be into the television chain and out the television receiver screens rather than via the customary motion picture utilization.

If short films are widely incorporated into didactic teaching presentations in medical colleges, the problem of student review of this film material may become imperative. For even visual teaching requires the fortification of repetition. Review showings[45] of film shorts on some scheduled basis may become necessary.

Summary

Short films are ammunition for the serious and alert medical college teacher. They now derive and in the future will increasingly come from the scholars of the medical sciences across the world. They may well comprise the cream of visual observations. Since they are the simplest of films, they should also be made by the individual for his own needs, once he learns something of film methods. They are the motion picture expression of medical phenomena and skills. And they are singularly adapted for appropriation by the medical instructor for his own highly personalized messages and approaches.

Nevertheless, short films require serious work in order to be properly assimilated into classroom teaching. They must be purchased, not loaned; for purchase is the essence of individual handling, editing and narration. Departmental budgets must be established for regular film purchase, just as one buys new books or equipment. The coming of a market will mean the improvement of services of all kinds, including improved production itself. Departmental short film libraries will permit teaching of far greater depth and effectiveness. Newer knowledge of film utilizational disciplines will be fortified.

The pedagogic muscles of the serious teacher will be immensely strengthened. His prestige among his students and fellow faculty members will be deepened. Most important of all, through these films the medical student will learn facts and skills which are specific and visual through specific visual tools of instruction which will augment the present systems of clinical instruction and controlled apprenticeship.

Double Value

The Planned Production of Simultaneous Long and Short Medical Motion Pictures

DAVID S. RUHE

IN THE PLANNING and production of conventional long medical teaching films designed for medical society showings, there are certain considerations which do not apply to the production of short films. Long films are designed to be complete "visiting speakers" in the county society program, introduced properly by a chairman and often supported by discussion handout booklets. They usually contain a good deal of filler material not ideally shown in motion pictures. And they reflect the opinions and feelings of their makers, occasionally even being film essays in the best documentary tradition.

Conversely, short films for the medical school are the bare bones of medical truth recorded on film. They are blunt, uncompromising, as noncontroversial and nonopinionated as possible. And they utilize the special talents of the film medium only to the point of real need and esthetic acceptability. Long films are likely to be early obsolescent[35] in portions of the pictures and narration alike. Short films may be obsolescent, but their loss or retirement is hardly felt. The very selection of subject matter of such shorts tends to predispose to long life and to slower obsolescence.

Almost all long films have portions which are worth excerptation as independent shorts. On the one hand, the task is to save the wheat when the straw is to be discarded. But even more important is the task of delivering, at the same release time, films suitable for the two different audiences and patterns of medical professional utilization. With proper planning it is possible to achieve, in a large number of cases, a true double value in medical films: a long film suitable for county societies and hospital staff groups, and a short or shorts suitable for the long-term classroom application of the medical school instructor.

The Identification of Short Films Within Long Films

In the search for short films within existing long medical teaching films, many valuable bits were discovered. In editing these shorts, however, several were revealed as too fragmentary for release as independent units. Although hindsight is not unrewarding, as examples below clearly show, foresight as usual is the better part of thoughtful production. If the concept of double releases for two different medical professional audi-

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ences is clearly in focus during planning, a certain number of films will lend themselves to these double rewards.

More or less spontaneously, short films have been lifted from much longer film units, to be distributed as independent units. The excellent British film, "Scabies 1946," had its seven-minute mite life cycle segment issued under the title "Scabies Mite"; indeed, the sections on Physical Examination, Epidemiology and Therapy might well have been excerpted from it also, except that therapy is always liable to early obsolescence. The splendid Swiss film, "Thrombosis and Embolism," now distributed by the Institute, has just had excerpted its six minutes on "Experimental Production of Thrombi and Emboli in Rabbits Following Experimental Vascular Trauma." The well-known General Electric Co. film, "Clean Waters," permitted the Communicable Disease Center, Public Health Service, to excerpt and distribute the animation sequence on the principles of operation of a sewage disposal plant. In the Communicable Disease Center film, "Manson's Blood Fluke," miscellaneous footage which remained unused after final editing was cut together to to make eight short "study films" for graduate students of parasitology.

During the cancer short films project, the professional film series of the National Cancer Institute and American Cancer Society was examined for potential excerpting.

"Breast Cancer: The Problem of Early Diagnosis" lent itself to easy derivation of shorts, since it already was clearly compartmented by titles which functioned as visual chapter headings.

Conversely, in "Gastro-Intestinal Cancer: The Problem of Early Diagnosis," the materials on gastric analysis, the guaiac test and hemoglobin analysis were too fragmentary for adequate excerptation, even though they appeared to be adequate within the context of the film itself.

These examples provide suggestive lessons for film production planners. First, fundamental biological phenomena such as life cycles, experimental and natural pathology, embryology and principles of sanitational processes are proper subjects for short films, as indicated by their criteria. Second, even though breast examination, the treatment of scabies and the performance of G-I tests are prone to controversy and to possible early obsolescence, they too can be readily fashioned into simple shorts whose lives may be assumed to be short and happy ones. Third, if the makers of "Gastro-Intestinal Cancer: The Problem of Early Diagnosis" had been clearly planning to issue brief shorts on the guaiac and Sahli tests, they would have carried through a more thorough camera coverage (which perhaps they did) even though in the long film they used only the called-for glimpses. Fourth, if the producers of the good "Embryology of the Eye"[37] had had the short film concept, their neatly compartmented film might well have been issued as shorts in addition to its auxiliary slides.

The Planning of Films for Double-Value Production

For good reasons professionally-produced medical films are usually expensive. Any major innovation which can possibly stretch the value of the production dollar is of keen interest to producers, sponsors and teachers. If the production of two film products for two closely related audiences can be achieved at only a

relatively small additional cost, this is a consideration to be studied.

First, the concept of double value itself must become real to sponsors and producers. Second, both long and short units must be treated as independent units even if they are overlapping or identical; that is, they must be scripted and storyboarded individually to be entirely sure of the production demands of each. Third, in planning for production, the problems of double work prints, double negatives or positives, double titles, etc., should be carefully thought through and precisely scheduled. Black and white film is relatively easy to handle in such overlapping production, especially in the problems of duplicate negatives and prints. Kodachrome poses very serious problems of obtaining adequate duplicate masters; and opticals from A and B rolls add further complications. Fourth, in the planning for distribution, the different channels for reaching the two audiences must be accounted for.

The Production of More Than One Film Simultaneously

In any well-conceived double production, one film is the primary target, the others are distinctly secondary. While the secondary films are considered in detail, they should NOT be permitted to interfere with the integrity of the first. If they do, the secondary films should be scrapped.

Notwithstanding this tenet of priorities, in certain cases where film subject matter and structure permit, the long film may be compartmented with appropriate titles. This in effect chapterizes the film and permits the design of short films within the overall context of the long film. These compartments can later be lifted out as independent units, with minimal effort and minimal interference with the original master. Such sections within films can, indeed, be printed from the original master itself if only a few prints are called for. Otherwise, the over-all number of prints which can be struck from one master must be the prime consideration. In recording the narration, sound track gaps should be knowingly created for easy excerptation. New titles often may be required, titles whose more explicit wording better fits the limitations of the short unit. Extra shooting also may be required on occasion, if only to round out details of the short unit sequences. Such a film, fitting this type of prescription almost exactly, was "Breast Cancer: The Problem of Early Diagnosis."

In George C. Stoney's "All My Babies,"[38] a 55-minute Institute training film in documentary form, the middle two reels of 20 minutes length shows a normal home delivery as attended by a midwife. It is nicely self-contained and beautifully visualized. Yet, for reasons of sociological and medical cultural implications, the excerpt may well prove to be misleading and unsatisfactory to certain audiences when it is viewed apart from its total framework. Therefore, this long excerpt film, planned in advance for a possible independent utilization, is to be tested with various groups before release of the double value shorter unit can be considered.

"The Embryology of Human Behavior"[39] has been planned for short film excerpting and utilization, and is awaiting financing of such conversion. As so often happens, original production financing did not permit the completion of the excerpts, but only delivery of the principal film.

One approach, feasible in a few

cases, is to produce and deliver the short film before its long brother is completed. In two films of fundamental biological subject matter whose production has necessarily been protracted, "The Life Cycle of the Human Hookworms" and "The Life Cycle of the Malaria Parasites" (both as yet unfinished), Malcolm S. Ferguson[18] at the Communicable Disease Center has experimented with trial shorts made in advance of completion of the major opus. "Blood Sucking Activities of Hookworms in the Intestine," "Infective Filariform Larvae of Hookworms," and "Malaria Parasites in the Red Blood Cells" have been unique shorts of a most revealing and dramatic nature. They would be precious even if the entire life cycle films, by some grievous mischance, were never completed.

Still another approach often used in the past with forethought and hindsight alike, is the method of editing. Here an original film is cut down to shorter and shorter versions, with different narrations perhaps for different purposes and audiences. One example is the National Film Board of Canada's "Challenge—Science Against Cancer," a 30-minute documentary produced in collaboration with the Institute primarily for college and high school student audiences. It was recut to 20 minutes for theatrical presentation under the name, "The Fight—Science Against Cancer."[40] Again, it was re-edited to a 10-minute Canada Carries On newsreel entitled "The Outlaw Within." Carrying this reduction division to its logical conclusion, in the presence of a short film market this film would doubtless have been excerpted in certain parts for far briefer sections on particular areas of research in cancer.

Examples of this practice of editing for new editions of older films are legion in the documentary and general educational film fields. Here the double value approach is widely recognized and practiced. Wherever commercial markets exist to demand that the film dollar be stretched to its limits, the unreality of the amateur approaches to sponsored films in medicine is brought into sharp contrast.

Apart from the crucial problems of accurate thinking and planning, the sheer mechanics of double value production must be overcome. This is the prime challenge to experienced production personnel, who know the great obstacles inherent in the details of motion picture fabrication.

Finally, the personality obstacles of the author, the producer, the director and the writer must be overcome, if the concept of double value production can have any validity in practice. In professional as in amateur production, the investment of self in something as consumingly interesting and rewarding as a motion picture can sometimes be a problem in itself. Granted the integrity of the author and producer, without which a real work of depth and honesty cannot be made, and granted the priority of the first film in the series to be created, the mass medium of films calls for a social responsibility which hardly exists in such individual crafts and arts as easel painting. This obligation to be coldly realistic and objective in the face of high personal enthusiasm and large investment of self must be applied to double value production. Short film excerptation demands that what is factual and vitally important, however small it may be, must be identified and isolated.

A single cardinal risk exists within

this concept of double value: the risk of dispersion of focus. Like the batter who fixes his eye on the ball up to the very impact with the bat, the assumption of a double value approach is also the assumption of a calculated risk that two complicated projects can be done at once or in tandem. If the complexity of the first priority film is high, it may be entirely unwise to undertake any further complication which would commit the entire project to the risk of failure. Conversely, the risk of failure with the first priority unit may be mitigated by the success of the second. For example, "The Fight" is a better film than "Challenge," and was the direct fruit of the audience reaction to the first film produced.

Distribution of Variable Audience Films

General distribution of medical films is never easy. Pinpoint distribution to precise audiences is even more difficult. In double value production, it is possible to end with films leveled at different medical professional and lay audiences, all with the same general film materials. Different, often piecemeal, avenues of distribution exist for each audience. A precise plan of distribution operations must be evolved in advance and carried through with determination. Such a plan might conceivably involve a commercial distributor, a group of independent medical or health agencies, film distribution service companies and even a corps of individuals such as detail men. There has been no value gained until a film is shown to its intended audiences. The sponsor, the producer and any other interested parties must accept the responsibility for assuring that film dollars are amortized in showings to film audiences.

Summary

The production of medical films for more than one audience in more than a single way can be planned in advance and executed with relatively small increments of time and money. There is, however, a high premium upon thoughtful preparation and detailed planning. There is abundant evidence and precedent to indicate that medical film dollars can be given double value in this way. Distribution arrangements are multiplied. Certain risks also are multiplied, but the rewards are potentially far greater.

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Editorials and Comments

Applicant Studies

MORE THAN A quarter of a century ago Dean B. D. Myers of Indiana University School of Medicine made the first study of applicants seeking admission to medical schools. He reported his study in the *Bulletin* of the Association of American Medical Colleges for January 1927, where he described in detail how the clerical work was handled, even to mention of the two eight-foot working files he had constructed to facilitate the work.

His first report was read at the 37th Annual Meeting of the Association. The group expressed its approval and voted to continue the study, although the discussion reported suggests that the problem of definition of an applicant was not being handled to the satisfaction of all deans, a difficulty we still have.

After the study of four successive groups, the funds made available by the Commission on Medical Education were exhausted and the studies were dropped.

Demands for the resumption of the project were so numerous that it was voted in 1931 to revive the study with the class entering in 1932. Fred Zapffe, secretary of the Association, continued the yearly report up to the second world war when it was discontinued again. The last class reported by Dr. Zapffe was that entering in 1941.

Again there was a demand for the resumption of this important work, and the new secretary, Dean F. Smiley, made a study of the class seeking admission in 1948. Thereafter, the director of studies of the Association undertook this project and has reported on it each year since.

There were 10,006 applicants who were reported as seeking admission to the freshman class of 1926-27. This number increased to 13,655 for the freshman class entering in 1929. Thereafter, the number of applicants remained close to the 12,000 mark until the years following World War II when the number spurted to 24,433 who sought admission to the freshman class entering in 1949. Since 1949-50 the number of applicants has been decreasing steadily, and there is every indication that there will be a further decrease this next year.

The degree of accuracy of the tabulations is dependent upon the completeness of the reports from the schools and upon the uniformity of procedures followed by the reporting institutions. The cooperation of the medical schools has been unusually good, although some schools are much slower than others in making their reports.

Information on the test scores is part of the current report for the first time. Scores on the Medical College Admission Test were located for 88 per cent of the applicants. This material is presented elsewhere in this issue.

With the use of modern tabulating methods a great deal of factual information about the applicants now can be obtained. Future studies should reveal additional information of value to the schools.

While the over-all figures reported

for the class which entered in 1952 show that roughly twice as many applicants sought admission as there were places in the freshman class, restrictions set up by various schools have decreased sharply the number and quality of their applicants.

The Association has a significant role to play in developing admission procedures which will permit freedom for each school yet provide regulation sufficient to give applicants the maximum opportunity to enter the school of their choice.

In 1928 Dean Myers observed: ". . . the schools of medicine in America occupy a position that is unique—unprecedented. No other school of any university is forced . . . to select so discriminatingly the membership of its class." This statement is no longer true.

An excess of applicants for graduate and professional schools has been common for several years. There is need today to encourage students who are able and qualified to interest themselves in medicine. There are not two fully qualified applicants for each place in the next freshman class. Indeed, some medical schools are having difficulty in finding qualified students to fill their freshman class.

Unsuccessful Applicants

BECAUSE MEDICAL SCHOOLS have more applicants than they can accept, each year some students fail to gain admission. Admission committees, therefore, will be interested in a recent study of the reactions of a group of applicants who failed to gain admission to medical school in 1948.*

The Committee on Student Personnel Practices of the Association of American Medical Colleges cooperated in this study by selecting a random sample of the applicants who were unsuccessful in 1948 and mailing to them the questionnaires designed by Arthur Jackson, author of the study. They were sent in 1950 to 1,000 unsuccessful applicants, 446 of whom returned the questionnaire. The questionnaires were returned anonymously, but by the postmarks it was determined that 42 states and the District of Columbia were represented.

Approximately one-fourth of this unsuccessful group who responded had gained admission to a medical school in one of the two subsequent years (1949 or 1950); one-third were in school in some other field (1950); the remainder were employed. Excluding those who had been admitted later, almost half continued to have a high interest in the field of medicine and either were still trying to obtain medical training or had selected work related in some way to the field of medicine.

Reported reactions to their failure to gain admission in 1948 (as remembered in 1950) were: hope for later admission, disappointment, and even bitterness and anger toward the medical schools. The feeling of disappointment often was accompanied by the feeling that their premedical "training" had been futile, leaving them unprepared for any other field. Apparently these students were taking their college work solely as vocational preparation and were unaware of the values of a liberal education. Sound counseling could show many of these students how they could use their education most effectively in fields other than medicine.

*Jackson, Arthur F., "When They Fail: A Follow-Up Study of Rejected Medical Applicants." Unpublished dissertation, Teachers College, Columbia University. 1952.

The reasons believed by these applicants to have been responsible for their failure to gain admission were:

Reasons Given	Percentage of Responses
Grades	35
Lack of influence	17
Excess of applicants to places available	17
Discrimination (racial or religious)	9
Requirements incomplete	7
Other reasons	11
Do not know	4

The most striking result is that almost all of the unsuccessful students, except those who realized they had not completed the requirements for admission, reported that they felt that they had been treated unfairly. Those who attributed their failure to gain admission to poor grades often made the comment that they knew others who had been admitted with a lower average, or that grades were a poor selection device.

In medical school admission a complex of factors, rather than a single one, is weighed to determine the acceptability of an applicant. Thus, it is frequent for a student with a lower average grade but with other good characteristics to be admitted. That grades alone are not an ideal selection device is widely recognized. However, they are a significant part of the individual's background and one of the best bases on which to predict success in medical school.

Much of the irritation among this unsuccessful group came about because the individuals were not told why they had failed to gain acceptance. Medical schools are well advised to give special attention to letters sent to unsuccessful applicants. Such letters should be friendly, yet realistic. They should inform the student of the great care with which applications are considered and stress the fact that no single factor determines acceptance. Rather, each applicant's total qualifications — personal, intellectual and academic—are taken into consideration. Such letters could go far to lessen the feeling of bitterness that often develops, as this study indicates.

Our Readers Write

Trends in Medical Education

VARIOUS CHANGES in emphasis in medical education have been suggested by some medical educators and by some foundations. One of these is that premedical students be trained intensively in the social sciences, if need be at a sacrifice of essential training in the basic sciences. Another would introduce home care programs in which medical students would participate even during their first year. In still another, medical schools are urged to establish curricula for training "general practitioners" who will understand and practice the broadest spectrum of total medical care.

The department of medicine at Columbia has been deeply concerned with current trends in medical education. After considerable discussion, it has been agreed generally that the standards of medical education in respect to internal medicine should

be maintained at the highest possible scientific level and that, in the long run, this will best serve medical care in the community.

The incorporation of the social sciences would seem of doubtful value at present; first, because these disciplines have not yet reached a definitive maturity which can find tangible application to medicine and, second, because it seems unwise to sacrifice the precious and already inadequate time which now can be devoted to more pertinent basic scientific training.

We would not wish to forfeit this precious time in order to teach those aspects of the practicalities of home care which are more effectively mastered later by the application of common sense and intuition in the course of long-continued responsibility for the care of the sick.

The necessity for practicing medicine under the most adverse circumstances is the only justification for what is termed "general practice." Surely it is anachronistic to believe that the level of patient care in this country will be raised by returning to an era of practice in which a single physician is expected to have competence in all aspects of medicine. The needs of areas in which proper facilities for the practice of modern medicine are virtually nonexistent should not be a restricting influence on the development of medical education.

The "family physician" should supersede the "general practitioner," and it is the function of the well-trained internist to be the family physician. His role is to know the patient and his environment, to care for him and his family in health and illness, to guide him to specialists when his problems require their skills and at all times to be his counsellor and friend.

The major defects in medical practice among recent graduates in the United States do not emanate from a lack of appreciation of socio-economic problems or of the role of the emotions in health and disease. Rather, the defects arise from (1) lack of adequate facilities such as hospital and laboratories, necessary for the study and care of the sick in their own communities; (2) lack of time to evaluate patients and their environment by means of *adequate* histories and the complex studies essential for a correct total appraisal of the individual, or (3) lack of dedication to the ideals of medicine, at times referrable to an unfortunate willingness to sacrifice the application of training for material considerations.

These defects will not be rectified by the introduction of sociological studies into the medical curriculum, nor by undergraduate home care programs, nor by the training of medical students to become "general practitioners." On the contrary, it is our firm belief that these programs will dilute further a curriculum already heavily taxed by the rapid growth of basic scientific knowledge essential for the care of the sick individual and for the continuing intellectual growth of the physician during his professional career.

ROBERT F. LOEB, DANA W. ATCHLEY,
Columbia

NEWS DIGEST

Educational Plan Needed

Help in setting up improved educational programs in backward nations would be more beneficial than direct economic aid, according to recommendations contained in a preliminary report on the educational systems of 59 free countries. Dr. Harold F. Clark, director of the Sloan Foundation Project in Applied Economics and professor of economics at Teachers College, Columbia University, visited each of the countries over the past 10 years. He reveals that 80 per cent of them have inadequate educational systems.

Dr. Clark estimates the expenditure of $50 million to $75 million would be necessary to set up such a program, far less than the amount needed to improve directly the economic status of the countries.

Most countries badly need skilled laborers and technicians. Particularly needed according to Dr. Clark, are more medical men, engineers and trained farmers. A detailed report of the survey is to be published next year.

Opposes British Plan

A spokesman for the Canadian Medical Association has declared that programs of compulsory health insurance, such as the one in operation in England, are a financial gamble. According to Dr. Arthur D. Kelly, deputy general secretary of the association, costs of the system are increasing each year. From an estimated $462 million a year, it has risen to more than a billion dollars in three years. Dr. Kelly recommended voluntary prepaid plans for Canada, with the government paying the premiums of the indigent.

Health Cost Surveys

The Health Information Foundation has announced four new studies to evaluate the voluntary health insurance plans in this country. Projects to be included are: (1) a survey of homes to determine the relationship of family medical costs to status of family health and how insurance plans affect this, (2) a study of the effect of "catastrophic" illness not covered by plans, (3) a study of how voluntary plans might be extended to groups not covered, such as farmers and the indigent, (4) a study of the relationship of family debts to medical costs.

Legislation

Medicine and the medical sciences received their share of attention during the first week of the 83rd Congress when scores of bills dealing with health care were filed. Many of the bills were not new; for example, Sen. Lister Hill's (D., Ala.) national health proposal. Other bills concerned the VA, tax-exempt pension funds for doctors, hospitalization for the aged, and care of military dependents. Little action is expected until organization of committees is completed in the next few weeks.

Commonwealth Fund

Annual report of the Commonwealth Fund reveals that nearly $2 million went for medical education, experimental health service and medical research during the last fiscal year. Substantial grants went to Western Reserve medical school for its experimental curriculum instigated this fall, to the University of Florida to help in planning a new medical school; to the University of Pennsylvania to expand their student health adviser program, and to the University of Tennessee for the support of a family general practice clinic.

Dr. Bierring Leaves Post

Dr. Walter L. Bierring, 85, for the past 20 years Iowa state health commissioner, has indicated he will not be a candidate for another term. However, he does not plan to retire, but wants to write a newspaper column and do some research on the public health problems of chronic disease.

Dr. Bierring served as a medical professor at State University of Iowa and Drake University for 20 years from 1893 to 1914, and spent the next 20 years as a consultant in internal medicine in Des Moines. He has served as president of the AMA, the National Board of Medical Examiners and the Iowa State Medical Society.

Meetings

Council on Medical Education

Experimentation in medical education was the theme of the February 9 meeting of the American Medical Association Council on Medical Education and Hospitals in Chicago. Dr. H. G. Weiskotten, council chairman, introduced the subject. A panel composed of members of the Western Reserve University School of Medicine faculty discussed the new curriculum at Western Reserve.

An address by Dr. Joseph C. Hinsey, member of the President's Commission on the Health Needs of the Nation and dean of Cornell University Medical College, dealt with the problems facing medical education as brought out by commission experience.

Dr. S. Howard Armstrong Jr., professor of medicine, University of Illinois College of Medicine, discussed the use of private patients in medical education.

Diamond Anniversary

Each of the nation's governors has been invited to name a 75-year-old doctor to attend the first western hemisphere conference of the World Medical Association as a guest of honor. The conference will be held in conjunction with the Pan-American Medical Confederation in Richmond, Va., April 23-25. Guests will be greeted by Dr. Louis H. Bauer, president of the AMA, and by medical leaders of Latin America.

Dr. Bauer, announcing the meeting, said that three-quarters of a century ago, life expectancy at birth was 34 years among industrial policyholders of a large life insurance company and a few years more for the population at large. During the lifetime of the men who will be guests of honor, the expectancy has advanced to 68 years for industrial and general population alike.

The World Medical Association Conference will review three-quarters of a century of progress and will survey the future of medicine, not only for the United States but for all the Americas.

Rural Health

Rural health will be the subject of a national conference in Roanoke, Va., February 27-28. Agricultural, civic and medical leaders will meet under the sponsorship of the Council on Rural Health of the AMA to discuss problems and financing of rural health programs. Dr. John M. Travis of Jacksonville, Texas, named "General Practitioner of the Year" at the recent AMA clinical session in Denver, will outline the role of the family doctor in rural health.

College of Surgeons

More than 2,000 surgeons from Canada and the United States are expected to attend an intensive four-day sectional meeting of the American College of Surgeons in Boston March 2-5. The program will include

panel discussions, symposiums, surgical clinics in 19 leading Boston hospitals, scientific papers and ciné clinic films. Sessions in general surgery, obstetrics and gynecology, ophthalmology, orthopedic surgery, otolaryngology, thoracic surgery and urology will be held.

Premedical Education

The role of the humanities and the social sciences in the premedical program were discussed at the fourth national symposium on premedical education, held in connection with the meeting of the American Association for the Advancement of Science in St. Louis, December 28. The symposium was cosponsored by Alpha Epsilon Delta, the national premedical honor society. Dr. Hugh E. Setterfield, professor of anatomy, Ohio State University School of Medicine, arranged the program. Papers presented at the meeting will appear as a unit in an early issue of *The Scalpel*.

Association of American Colleges

About 500 college administrators attended the 39th annual meeting of the Association of American Colleges in Los Angeles last month. The financial problems of colleges and universities were discussed, and a report was made on cooperative fund-raising organizations of colleges, which are showing encouraging results. Some 350 colleges belong to the united-group program.

The Ford Foundation has indicated that it will help support the movement by helping to set up a national clearing house for the groups.

Other serious problems discussed were academic freedom, the control of the education of teachers and the necessity of unity within the educational profession.

Fellowships, Grants, Awards

Palmer Senior Fellowships

Establishment of the Lowell M. Palmer Fund for senior fellowships in the medical sciences was announced by Dr. Joseph C. Hinsey, dean of the Cornell University Medical College. The fund has been created by gifts to Cornell by Carleton M. Palmer, former chairman of the board of E. R. Squibb and Sons, in memory of his father, the late Lowell M. Palmer. The fellowships are intended to provide for the continued support of young men and women who have proved their ability as medical teachers and scientists while on post-doctorate fellowships.

Cornell Medical College will handle the administration of the fund, but recipients of fellowships will not be limited to the Cornell staff and will be chosen by a board which includes representatives from several medical schools. The board will consist of Dr. Walsh McDermott as chairman and Dr. Geoffrey Rake as vice chairman, acting as permanent members, together with four rotating members to serve for a period of one year. Although the fund may receive periodic increments, it will be self-liquidating.

It is anticipated that approximately five Lowell M. Palmer senior fellowships will be available during the first year of operation of the special fund.

Basic Science Fellowships

Ten fellowships offered at the colleges of medicine, dentistry and pharmacy through the Graduate College of the University of Illinois will be awarded to qualified scholars who contemplate academic or research careers in the medical and allied sciences. The fellowships provide an opportunity for course work and research experience in the basic sciences and their application to

problems in clinical investigation. Applications must be made by March 15. Forms may be obtained from Dr. Milan Novak, associate dean for the professional colleges, University of Illinois, 1853 W. Polk St., Chicago 12.

Teaching Developments

Occupational Health Program

An occupational health program under the joint sponsorship of the University of Pennsylvania and the Chamber of Commerce of Greater Philadelphia will get under way this month. A new course in industrial medicine has been established and is open to all interested firms, business concerns and individuals in the area. It will be conducted by medical authorities at the university.

As a first step in the program to broaden and stimulate industrial medical research, the sponsors announced a special series of 12 lectures which are to start this month and continue through May 6.

Applications and correspondence concerning the course are being handled by Dr. John P. Hubbard, professor and chairman of the department of public health and preventive medicine.

Interchange Plan

Stemming from the interest of the students themselves, the University of Cincinnati's colleges of law and medicine have set up a novel interchange plan designed to help each group understand problems of the other.

Under the program, law students during the first semester attend a weekly medical college diagnostic clinic at Cincinnati General Hospital. During the second semester, medical students will visit the law college to become trial witnesses in its student practice court.

Both medical and legal educators feel it is important that doctors and lawyers understand each other and what each is attempting to do. With this accomplished, better medical evidence and more just decisions should result.

College Briefs

Albany Medical College

Dr. HAROLD C. WIGGERS has been named dean of the medical college effective April 1. He will remain as professor of physiology and pharmacology. He succeeds Dr. JAMES A. CAMPBELL, who goes to the University of Illinois College of Medicine as professor of medicine and chairman of the department of medicine at Presbyterian Hospital. Dr. Wiggers was graduated from Wesleyan University and received his Ph.D. from Western Reserve in 1936. He has been a member of the faculties of Western Reserve University, Harvard Medical School, Columbia University and the University of Illinois College of Medicine.

A series of 18 weekly seminars is being given under the sponsorship of the medical college and the Albany Veterans Administration Hospital. Seminars are being conducted by investigators and clinicians from Johns Hopkins, Harvard, Columbia, University of Pennsylvania and other medical schools and scientific institutions in the east. The seminars are an important segment of the 1952-53 postgraduate program which has been expanded greatly this year.

Chicago Medical College

Dr. I. SNAPPER, Holland-born in-

ternist who was formerly professor of medicine at the University of Amsterdam and chief of the department of medicine at Union Medical College in Peiping, China, has been appointed professor of medicine.

A series of lectures on somatopsychic relationships will continue through February 24. Speakers scheduled for February are Dr. THEODORE CORNBLEAT, University of Illinois; Mrs. FRANCES COOKE MACGREGOR, New York University College of Medicine; and Dr. HARRY H. GARNER, Chicago Medical School.

College of Medical Evangelists

Dr. RALPH THOMPSON became head of the department of obstetrics and gynecology on the Los Angeles campus January 1.

Added impetus is being given to basic research on the Loma Linda campus with the recent establishment of a electromicroscopy laboratory. Dr. ROBERT WOODS, biophysicist, is in charge of the electron miscroscope and the auxiliary equipment. In addition to initiating research within the unit, it is to serve all teaching departments of the school of medicine on the Loma Linda campus.

Dr. JACOB JANZEN, associate clinical professor of general surgery, left early in January for the Vellore Christian Medical College in India where he is to teach surgery.

Recognizing that information must first be disseminated among internal publics, the public relations office now distributes a weekly newsletter to 250 faculty and staff members every week. In expanding the service from one to both campuses, the PR staff noted that "common information always tends to create an environment of understanding which develops singleness of purpose and the reaching of objectives."

University of Colorado

Construction of a modern cardiac research center is complete at the school of medicine. The project is being financed by a grant of $250,000 from the National Heart Institute. New facilities consist of 42 rooms, with the latest in laboratory equipment. There will be 26 laboratories, including three for cardiovascular-pulmonary diseases in children.

Dr. HERBERT S. GASKILL, Indiana University Medical School, has been named director of psychiatric services and professor and head of the department of psychiatry. He succeeds Dr. FRANKLIN EBAUGH who retired from the university January 1. Dr. Gaskill will assume his duties this summer.

The appointment of Dr. ROBERT H.

THE NEW dean of the Yale School of Medicine, Dr. Vernon W. Lippard (left) was welcomed by his predecessor, Dr. C. N. Hugh Long when he assumed his office last month. Dr. Lippard received both his undergraduate and medical training at Yale and for the past three years was dean of the medical school at the University of Virginia. Dr. Long continues his teaching and research as chairman of the department of physiology at Yale.

ALWAY as professor and head of the department of pediatrics was announced recently. He has been associate professor of pediatrics at Stanford University School of Medicine.

The school of medicine published the first issue of a quarterly newsletter to alumni in November 1952. It was sent to about 1,400 medical homes. It is designed to keep Colorado graduates informed of school and alumni activities.

Duke University

Dr. WILEY D. FORBUS, chairman of the pathology department, has been appointed consultant to the U.S. Atomic Energy Commission's Division of Biology and Medicine. He will serve as consultant in the south on pathological problems relating to claims against the government for radiation and other types of injury.

Duke has received a $9,928 March of Dimes grant for muscle research to combat polio. Recipient is Dr. J. E. MARKEE, chairman of the department of anatomy, who has been conducting research aimed at improving the results of muscle transplant operations needed by paralyzed polio patients.

George Washington University

Two Public Health Service grants totaling $14,377 have been awarded to George Washington scientists to promote cancer research. A $10,584 grant will permit continued study of the manner in which nitrogen mustard gas and related drugs affect experimental tumors. A $3,793 grant will allow continued study of the part played by cell multiplication in causing cancer.

Harvard University

The government of Belgium has presented one million francs to the school of public health in memory of Dr. RICHARD PEARSON STRONG, who led scientific expeditions to the Belgian Congo to help combat tropical diseases. Dr. Strong was professor of tropical medicine at Harvard from 1913 to 1938, and professor emeritus until his death 10 years later.

Hahnemann Medical College

A teaching affiliation has been made with the Guthrie Clinic—Robert Packer Hospital at Sayre, Pa. Beginning with the 1953-54 academic year, groups of fourth-year students will receive four weeks of instruction covering medicine, surgery and pediatrics as clinical clerks in the hospital and outpatient services of this clinic. Members of the clinic who will carry the major portion of the teaching load will receive affiliate faculty titles. Close correlation of teaching methods and subject matter will be maintained through Dr. WILLIAM C. BECK, a member of the senior surgical staff of the clinic, who will act as educational director of the teaching program.

A $15,000 grant has been received from the National Heart Institute for research in the department of thoracic surgery under Dr. CHARLES P. BAILEY.

University of Buffalo

Dr. GILBERT M. BECK, psychiatrist-in-chief of the medical school, died January 9 after a two-week illness. He was a 1923 graduate of the medical school and had been a faculty member for 24 years.

University of Illinois

Dr. ROGER A. HARVEY has been appointed as acting dean of the college of medicine by the board of trustees. He has been serving as professor of radiology and head of the department. He is also radiologist-in-chief of the University of Illinois Research and Educational Hospitals. He will continue in both of these capacities.

Nine research grants have been awarded recently by private industry, pharmaceutical houses, national and local health organizations and individuals. They include $19,500

THE RECENTLY completed medical science building at the University of South Dakota, which was used for classes for the first time last fall.

from the Gillette Safety Razor Company for studies under the direction of Dr. L. L. GERSHBEIN on the role of the sulfhydryl group in cellular metabolism and $5,000 from the United Cerebral Palsy Association to continue a study on the neuropharmacologic approach to the treatment of cerebral palsy under the direction of Dr. KLAUS R. UNNA.

Dr. CRAIG D. BUTLER has been promoted from clinical associate professor of pediatrics to a full professorship. He has been associated with the college since 1941.

Jefferson Medical College

DR. GEORGE A. BENNETT, dean, served as president of the section on medical education and public health of the 8th International Cruise Congress of the Pan-American Medical Association January 7-19.

News reports have indicated that MAJOR GENERAL HOWARD McC. SNYDER, a Jefferson graduate (1905) will be personal physician to President Dwight D. Eisenhower. General Snyder served General Eisenhower in the same capacity during World War II in the European theater.

University of Louisville

New appointments include Dr. JOSEPH P. HOLT, professor of heart research in the department of medicine and director of the Institute of Medical Research; Dr. EVERETT L. PIRKEY as chairman of the department of radiology; Dr. RUDOLF J. NOER, as professor and chairman of the department of surgery; Dr. JOHN F. TAYLOR as professor and chairman of the department of biochemistry and Dr. JOHN F. MILEY as professor of military science and tactics.

Dean J. MURRAY KINSMAN succeeds Dr. R. ARNOLD GRISWOLD as chairman of the dean's committee.

University of Maryland

Dr. HENRY J. L. MARRIOTT, assistant professor of medicine, has become consultant to the editorial department of The Williams & Wilkins Company, medical publishers.

University of Michigan

A progress report from the Michigan-Memorial Phoenix Project indicates considerable progress in developing peacetime applications for

atomic energy during the past 12 months. In a fund-raising campaign the Phoenix Project is over the $6,250,000 mark towards the initial goal of $6,500,000. According to Dr. RALPH A. SAWYER, director, 54 research projects bearing on some aspect of atomic energy have been approved, with 14 brought to successful completion.

A total of $45,193 has been granted by the University of Michigan School of Graduate Studies to faculty members for work on some 28 research projects, many of them in the medical sciences.

University of Missouri

Dr. ROSCOE L. PULLEN of the University of Texas has been appointed dean of the school of medicine. He also will have the titles of professor of medicine, medical consultant and executive officer of the State Crippled Children's Service and director of the University Hospitals.

New York University—Bellevue Medical Center

The cornerstone for the new Henry W. and Albert A. Berg Institute for Experimental Physiology, Surgery and Pathology at the medical center was laid in December. As part of the ceremony, a check for $500,000 for construction of the institute was presented to WINTHROP ROCKEFELLER, chairman of the board of trustees of the medical center.

A recent March of Dimes grant of $23,145 will enable the medical center to continue its reference center for up-to-date information on appliances for the rehabilitation of handicapped persons.

Northwestern University

Dr. ROBERT I. WATSON, assistant dean of the Washington University School of Medicine, has been appointed professor of psychology and director of the graduate training program in clinical psychology.

University of Pennsylvania

Appointment of a joint administrative board of six members to carry out the objectives of the alliance between Pennsylvania Hospital and the graduate school of medicine has been announced. The two institutions are joining forces at Pennsylvania Hospital to extend facilities for patient care, as well as for graduate teaching and research. Tentative plans call for extensive new construction at the hospital. One or more new buildings are to be erected and others will be altered.

During the week February 2-7 the Henry Phipps Institute will celebrate its 50th anniversary. The institute was founded in 1903 for the study, treatment and prevention of tuberculosis. A medical session and social activities will mark the anniversary.

University of Pittsburgh

Twenty Pittsburgh industries have subscribed more than $4,900,000 for a new building for the schools of medicine and nursing. This sum represents two-thirds of a total of $7,500,000 established as a quota for industry and business as their share in the $10 million building program. The new building will make it possible to increase by 50 per cent the number of doctors graduating from the medical school and will provide adequate facilities for the school of nursing.

St. Louis University

Dr. JAMES W. COLBERT JR. has been appointed dean of the school of medicine and will assume his duties in March. He will be the youngest dean of any major medical school in the United States. He was 32 years old on December 14. Dr. Colbert comes to St. Louis from Yale University School of Medicine where he has been assistant dean in charge of postgraduate studies.

A report on "The Clinical Value of Anti-Cancer Drugs" given by Dr. G.

O. BROUN, professor of internal medicine and director of the resident staff of the school of medicine, before the recent meeting of the American Association for the Advancement of Science, has been selected by the U. S. Department of State for broadcast on "Radio University" over the Voice of America. Dr. Broun will tape-record his address for broadcast at a later date.

University of South Dakota

Dr. ROBERT S. ANDERSON, professor of physiology, took part in a scientific meeting at Cambridge in December. He received a grant from the National Science Foundation for the trip. He took part in a symposium sponsored by the Faraday Society on the chemistry of biological after-effects of ultra-violet and ionizing radiations.

Southwestern Medical School

The Victor Hexter Memorial Lectureship Fund in Psychiatry has been established at Southwestern Medical School of the University of Texas by a gift of $1,000 from LOUIS J. HEXTER in memory of his father. The fund will be used to bring outstanding teachers of psychiatry to the school. In addition to delivering formal lectures, the visiting professors will meet with faculty members and students in informal conferences and seminars. Emphasis of the program will be placed as far as possible on the development of close relationships between the department of psychiatry in the medical school and the community.

Stanford University

A refinement of Stanford's widely used Strong Vocational Interest Test will now tell a man not only whether he is likely to enjoy being a doctor, but also what kind. More than 4,000 physicians and nearly 800 medical school seniors were queried in developing the new test. Dr. EDWARD K. STRONG JR., professor emeritus of Stanford, and COLONEL ANTHONY C. TUCKER of the Army Medical Service Corps are the investigators.

THE PROPOSED Henry W. and Albert A. Berg Institute for Experimental Physiology, Surgery and Pathology, to be constructed at New York University, Bellevue Medical Center.

Tufts College

Dr. JOSEPH M. HAYMAN JR., professor of medicine at Western Reserve, will take over his duties as dean of the Tufts College Medical School on April 1. In addition to holding the deanship, he will be professor of medicine and senior physician at the New England Center Hospital and the Pratt Diagnostic Clinic.

Dr. CHARLES G. CHILD III has been named surgeon-in-chief of the New England Center Hospital-Pratt Diagnostic Clinic and professor of surgery at the medical school. He comes to Tufts from Cornell, where he has been associate professor of clinical surgery.

University of Washington

Construction is under way on the first unit of the teaching hospital, which will contain limited outpatient facilities, a 25-bed unit for the study of special problems, and laboratory, office and teaching areas for the clinical departments.

For the first time this year, the department of surgery is in charge of a program in which fourth-year students spend three weeks of their total surgical assignment period as clerks in one of the private hospitals of the community. Participating hospitals are Swedish, Doctors, Virginia Mason and Providence.

Recent grants include $13,000 from the Public Health Service for experimental research on epilepsy; $17,000 from the Air Force and Navy for research on concussion; $50,260 from the Air Force to conduct a study of the diagnosis of military performance from the physiological and behavior patterns of experimental stress; $31,720 from the Air Force for research on life stress, adaptive behavior and adrenocortical function, and $18,553 from the Army Quartermaster Corps to develop and validate a battery of tests for the quantitative measurement of the recuperative value of sleep.

Vanderbilt University

An annual lectureship has been established in memory of Dr. BARNEY BROOKS, late professor of surgery, through the gift of an alumnus. First lecture was given January 21 by Dr. EVARTS A. GRAHAM, emeritus professor of surgery, Washington University School of Medicine, on "The Relation of Cigarettes to Bronchiogenic Carcinoma."

Medical College of Virginia

Dr. CLAUDE C. COLMAN, associated with the medical college for 42 years, died January 9 after a long illness. He was 73 years old. Dr. Coleman founded the neurological departments at the Medical College of Virginia and the University of Virginia. He is credited as one of the originators of the Blue Cross hospitalization plan.

Wayne University

The college of medicine sponsored its second annual symposium on blood January 17. Between 200 and 300 persons heard scientists from many states discuss latest advances in the study of blood, as it is related to their field of special interest. DR. WALTER H. SEEGERS was chairman of the symposium.

West Virginia University

Construction has begun on the mechanical plant of the new four-year school of medicine, dentistry and nursing at Morgantown. The first unit of the new construction will cost an estimated $835,000. Completion of the medical center is expected to take 10 years.

Audiovisual News

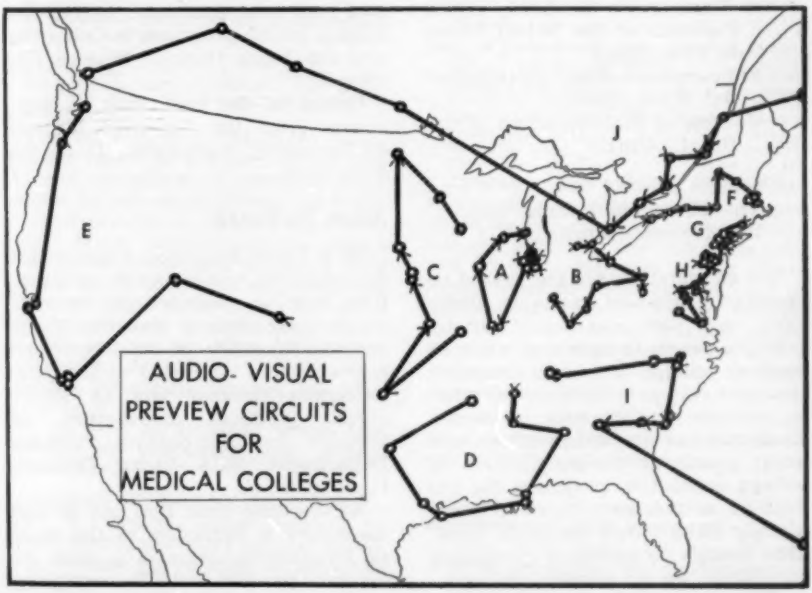
Preview Circuits Begin

On January 12, the 10 preview circuits in the United States and Canada began operation (see Journal of MEDICAL EDUCATION, November 1952). The preview circuits are designed to provide the medical colleges with the opportunity of seeing some of the more useful audiovisual materials in the field of medical education. The circuits are self-operated in that the materials are shipped directly from college to college as shown on the map. The materials are provided by producers and turned over to MAVI for circuit use only. The college audiovisual coordinators receive advance information on each program and make preview arrangements for fellow faculty members.

Circuits A and B commenced operation at the beginning of November on a trial basis. The success of the plan with the colleges in circuits A and B and the acceptance of the idea on the part of other colleges consulted indicate that the plan will prove valuable.

All colleges received information on the preview plan in December and were asked if they wished to participate. By January 12, 62 colleges had indicated a desire to be included, while six colleges indicated that they wanted further time to organize their facilities to handle the programs as they arrive for preview.

A new program is being fed into all the circuits every two weeks and is held by each college for a period of one week, including weekend transportation time. The program is then forwarded to the next college on the circuit. At the time of publi-



cation, each of the colleges marked with an arrow head is holding a program for preview purposes.

The materials planned for the spring semester include the following:

PROGRAM NO. 1:
- Functional Anatomy of the Hand (film).
- Autonomic Nervous System (film).
- Autonomic Nervous System (slide set).

PROGRAM NO. 2:
- African Typanosomiasis (film).
- Life Cycle of the Malaria Parasite (film).
- Life Cycle of the Malaria Parasite (filmstrip).

PROGRAM NO. 3:
- Meiosis (film).
- A Stereoscopic Atlas of Human Anatomy (book, transparencies and View-Master).

PROGRAM NO. 4:
- A Cinematographic Study of the Function of the Mitral Valve in Situ (film).
- Subcutaneous Blood Flow in the Bat Wing (film).
- Congenital Malformations of the Heart (film).

PROGRAM NO. 5:
- The Liver (four filmstrips).
- Bloodvessels (filmstrip).

Not all materials are the newest or necessarily the best available. However, each item was considered by Institute panels to have real value in medical schools and it is intended that each college will determine what is suitable in its own situation. Evaluations of the 1952 programs will assist greatly in the formulation of college acquisition programs for the 1953-54 school year. Some colleges already have found materials valuable enough to purchase or request for future use on a rental basis.

Educational TV Handbook

The American Council on Education announces a handbook on educational television with information on all phases of the subject, ranging from where to locate a new station to how to give a lecture before a camera. The 285-page volume, entitled "A Television Policy for Education," is edited by Carroll V. Newsom, associate commissioner for higher education of New York State. It is based on the addresses and discussions at the Television Programs Institute, held at Penn State in the spring of 1952, when TV station operators, producers, engineers and legal counsellors met with educators to find ways of using the 242 reservations made for educational stations by the FCC.

The book instructs local communities on how to apply for a license to operate a TV station, how to finance station construction and operation and how to produce effective programs. It also describes the significant types of educational programs that have been produced, such as the weekly health programs in Columbus and the Johns Hopkins Science Review.

Copies of the book may be purchased from the American Council on Education, Washington, D. C., for $3.50 each.

Silent To Sound

RCA Victor announces a film which demonstrates how sound or commentary may be recorded on 16 mm. magnetically striped film. The film is entitled "You Are the Producer," and is available to interested medical film producers through any of RCA's visual products distributors, or through the Engineering Products Department, RCA Victor Division, Camden, N. J.

At the same time, Bell and Howell announces a reduction in the price of *Soundstripe* from 3½ cents to 2½ cents per film foot. The new price

applies to both single and double perforated film. The magnetic iron oxide stripe makes it possible to record sound on new or old films without laboratory processing. "Home" sounding does require, of course, one of the many makes of special projectors capable of recording and projecting films with either magnetic or optical tracks. (See Journal of MEDICAL EDUCATION, May 1952 and November 1952.)

Summaries of Film Reviews

These brief notes on some miscellaneous medical motion pictures are intended to afford an offhand idea of the desirability and use of the film under review. They are drawn from the detailed evaluative reviews prepared by the Medical Audio-Visual Institute of the Association of American Medical Colleges.

African Trypanosomiasis (Code No. MN 6839)

16 mm., color, sound, 564 ft., 16 min.

Year of Production: 1951; **Country of Origin:** U.S.A. **Producer:** U.S. Navy Department (U.S. Naval Photographic Center for Bureau of Medicine and Surgery).

Distribution: Audio-Visual Training Aids Section, Bureau of Medicine and Surgery, U.S. Navy Department, Washington 25, D. C.

General Statement: This Navy photographic report of a portion of its 1948 African expedition is combined with motion picture material from the South African government film "Nagana." The result is an orientational film which touches upon the high points of both human and bovine trypanosomiasis, the life cycle of the tsetse fly, and the present developments toward control of the disease and the fly. Within its limitations and photographic shortcomings, the film adequately sketches the principal facts of the two related diseases, and provides an authentic introduction suitable for professional and subprofessional students.

Audience: Students of tropical medicine, in medical schools, schools of public health, veterinary medical schools and colleges (in courses in parasitology).

The Life Cycle of the Malaria Parasite

16 mm., color, sound, 783 ft., 21 min.

Year of Production: 1952; **Country of Origin:** Great Britain. **Sponsor:** Imperial Chemical Industries, Ltd. Manchester, England; **Scientific Adviser:** Col. H. E. Shortt, C.I.E., M.D., D.Sc. **Producer:** Oswald Skilbeck, M.A.; **Devised by:** Seafield Head; **Unit Director:** Charles Legg.

Distribution: Imperial Chemical Industries, Ltd., Manchester; (in U.S.) I.C.I. Film Library, 521 Fifth Ave., N. Y. 17. **Loan.**

General Statement: This all-animated instructional film in technicolor presents currently accurate scientific material on the life cycle of the malaria parasites in man and the Anopheles mosquito. The section on the three phases of the life cycle is well done and very useful; the section on biological classification and differential diagnosis appears to be poorly suited for motion picture teaching, and classroom utilization combined with other visual tools is strongly suggested.

Audience: Students of medical parasitology, in colleges, medical schools, schools of veterinary medicine, and schools of public health.

Meiosis—Growth Cleavage (Maturation Division) in the Sperm Cells of the Grasshopper Psophus stridulus L.

16 mm., black-and-white, sound, 640 ft., 18 min.

Year of Production: 1942; **Country of Origin:** Germany. **Sponsor:** Zeiss Optical Works, Jena, Germany; **Author and Producer:** Kurt Michel; **American Revision:** Arthur T. Brice and Dr. Robert L. Bacon, Stanford University School of Medicine.

Distribution: Arthur T. Brice, Phase Films, Box 423, Ross, Calif.; **Sale:** $75; **Rental:** $14.

Summary: This teaching film for college biology courses comprises unique phase contrast cinemicrography of meiosis and mitosis as observed in the process of spermatogenesis in the grasshopper *Psophus stridulus*. Composed of illuminating original German footage, the American revision includes simple diagrams and English narration, and is useful, if somewhat redundant, for medical college utilization.

Audience: Students of biology in colleges, students of embryology and cytology in professional schools.

Intra-Oral and Pharyngeal Structures and Their Movements

16 mm., color, sound, 812 feet, 22 min.

Year of Production: 1950; **Country of Origin:** U.S.A.; **Producer:** Audio-Visual Production Services, Communicable Disease

Center, Public Health Service, and Medical Illustration Laboratory, Veterans Administration Hospital, Chamblee, Ga.; **Scientific Advice:** Dental Service, Veterans Administration Hospital.

Distribution: United World Films, 1445 Park Ave., New York 29; **Sale:** Inquire: V.A. Central Office Film Library, Motion Picture Section, U.S. Department of Agriculture, Washington 25, D.C., **Rental.**

Summary: This film presents the spoken case history of a patient with wide surgical excision of a sarcoma of the left maxilla; it records and attempts to interpret the muscular actions strikingly visible in the surgical defect during mastication, deglutition and speech. Although the case material is potentially remarkably illuminating, the revealing cinematography is not matched by an equally clear purpose, organization and narration. Effectiveness is far lower than the richness of the material deserves, and utilization should be improvised by the trained instructor.

Audience: Maxillo-facial and oral surgeons; anatomists and physiologists; students of anatomy and physiology in medical schools, colleges and postgraduate medical courses.

Bronchoscopic Cinematography of Bronchiogenic Tumors

16 mm., color, silent, 407 ft., 17 min.

Year of Production: 1945; **Country of Origin:** U.S.A.; **Sponsor:** The Jacques Holinger Memorial Fund, Chicago; **Authors:** Paul H. Holinger, M.D., and Ralph G. Rigby, M.D., Chicago.

Distribution: The Jacques Holinger Memorial Fund, 700 N. Michigan Ave., Chicago 10; **Sale:** $100; **Rental:** $15.

Summary: A methodical and carefully chosen selection of excellent bronchoscopic motion picture illustrations of of bronchial tumors and lesions simulating tumors, with x-rays for interpretation. Uniquely effective in presenting a variety of beautiful endoscopic cases, utilization by the expert in thoracic diseases may be readily if carefully undertaken with a variety of audiences.

Audience: Otolaryngologists, chest specialists, postgraduate students of bronchoscopy, residents and interns.

Grief—A Peril in Infancy

16 mm., black-and-white, silent, 850 ft., 35 min.

Year of Production: 1947; **Country of Origin:** U.S.A.; **Author and Producer:** Rene A. Spitz, M.D., in collaboration with Katherine M. Wolfe, Ph.D.

Distribution: Rene A. Spitz, M.D., 1150 Fifth Ave., New York 28; **Sale:** $150; **Rental:** $4.50 per day.

Summary: This edited case record film demonstrates the effects of emotional deprivation upon infants in their first year, and makes observations of reversible depressive behavior during maternal absences up to three months, and psychotic symptoms with grave mental and physical retardation during the mothers' permanent absence. Although it does not and cannot clarify many important psychotic considerations, and tends to emotionalize the subject in its long titles, the film material is intensely moving and authentic, and has a wide potential curriculum application.

Audience: Students of psychiatry and child development in under- and postgraduate courses in medicine, psychology, sociology, and penology; lay groups, if used with expert psychiatric guidance.

A Psychoneurosis With Compulsive Trends in the Making (From "Series of Studies on Integrated Development: The Interaction Between Child and Environment")

16 mm., black-and-white, silent, 1320 ft., 55 min.

Year of Production: 1947; **Country of Origin:** U.S.A.; **Sponsors:** Scottish Rites Committee on Dementia Praecox; Discretionary Fund of the Greater New York Fund; **Authors:** Margaret E. Fries, M.D., New York Infirmary, assisted by Paul J. Woolf, M.S., New York.

Distribution: New York University Film Library, 26 Washington Place, New York 3; **Sale:** $110; **Rental:** $6 per day. Accompanying Material: "Instructor's Guide to a Psychoneurosis with Compulsive Trends in the Making" by Margaret E. Fries, M.D., published by New York University Film Library, 41 pp. (mimeo).

Summary: This edited case record film of a girl observed from birth to puberty demonstrates the dynamic interaction between the child and her environment, principally the parents, and the limiting effect of the family pressures upon her personality development. The film is a document of authentic power for psychologically oriented professional audiences, despite its plethora of titles. For optimum effectiveness, it should be presented by an expert instructor.

Audience: Students of psychiatry and psychology in graduate schools of medicine, social work, psychology and public health.

Psychotherapeutic Interviewing Series—Part II: A Method of Procedure

16 mm., black-and-white, sound, 1120 ft., 31 min.

Year of Production: 1949; **Country of Origin:** U.S.A.; **Producers:** Presentation Division, Veterans Administration, for Department of Medicine and Surgery, Veterans Administration; **Technical Advisers:** Jacob E. Finesinger, M.D., Harvard Medical School, and Florence Powdermaker, M.D., Veterans Administration.

Distribution: For **purchase** address Chief, Medical Illustration Division, Research and Education Service, Department of Medicine and Surgery, Veterans Administration, Washington 25, D.C.; **Rental** from Central Office Film Library, U.S. Department of Agriculture, Office of Information, Motion Picture Service, South Building, Washington 25, D.C.

Summary: A single recorded unrehearsed psychotherapeutic interview provides the clinical background for discussion of procedures and basic principles of "insight therapy." The interview is conducted with skill, but its camera recording leaves much to be desired. The film is a valuable source of clinical observation, and should be utilized by a competent psychiatrist.

Audience: Students of psychotherapy, general practitioners, interns, psychiatric social workers and guidance workers.

Bronchiogenic Carcinoma

16 mm., color, sound, 600 ft., 16 min.

Year of Production: 1951; **Country of Origin:** U.S.A.; **Producer:** Motion Picture Service, U.S. Department of Agriculture, under the direction of Presentation Division, Veterans Administration, for Department of Medicine and Surgery, Veterans Administration; **Surgery:** Brian S. Blades, M.D., Washington, D. C.; **Script:** Oeveste Granducci; **Direction:** Nicholas Webster; **Camera:** Homer Boor; **Bronchoscopic Cinematography:** Paul H. Holinger, M.D., Chicago.

Distribution: United World Films, 1440 Park Ave., New York 29, **Sale:** address **loan** request to V. A. Central Office Film Library, Motion Picture Section, U.S. Department of Agriculture, Washington 25, D. C.

General Statement: This well-photographed orientational film presents the incidence of lung cancer and its detection by symptomatology, x-ray, bronchoscopy and cytology, illustrates a right pneumonectomy in some detail, and gives some hints of postoperative management. The film lacks clarity of purpose, consisting of superficial diagnostic and prognostic material at an elementary level of comprehension and yet showing an operative procedure which is fully intelligible only to the trained surgeon. Nevertheless, the film will be useful as a reminder of or introduction to existing diagnostic and therapeutic procedures.

Audience: Medical students, general practitioners.

The Diagnosis of Surgical Lesions of the Alimentary Tract Part I: The Primary Examination (Code No. PMF 5177a)

16 mm. (taken on 35 mm.), black-and-white, sound, 735 ft., 20 min.

Year of Production: 1950; **Country of Origin:** U.S.A.; **Producer:** U.S. Army.

Distribution: Address loan request, with code number, to Commanding General, Attention: Surgeon, Headquarters First to Sixth Army (according to location of user).

General Statement: This instructional film attempts to portray the proper approach of the Army general practitioner to the diagnosis of disorders of the alimentary tract, from the patient's first visit to the point where the physician has employed all the diagnostic means in his own hands and feels that a hospital workup is indicated. This content, developed in a stiffly reenacted story of a typical patient, contains almost no information that is not already well known to a qualified graduate of medicine and it omits, nonselectively, many points of importance. The film's shortcomings greatly limit its value for professional audiences, although with proper interpretation it may be of use for medical students.

Audience: Medical students, recent graduates of medicine.

Book Reviews

Living Agents of Disease

James T. Culbertson, Squibb Institute for Medical Research, executive secretary, microbiology and immunology study section and virus and rickettsial study section, National Institutes of Health; **M. Cordelia Cowan,** educational director of postgraduate school, Woman's Hospital, New York. G. P. Putnam's Sons, New York, 1952. Illustrated with photographs and drawings. 624 pp. with index. $5.50.

Beginning with the premise that "health is everybody's business," the authors proceed to show the impact of such disease agents as viruses, bacteria, molds and parasites, on the life of man in his varied social setting. The subject matter is necessarily broad in scope and is presented in 60 short chapters with appropriate tables and illustrations.

The chapters are divided into seven groups or units. Chapters 1 to 4 are introductory and cover the classification of organisms, how they produce disease, and highlights in the development of present knowledge of specificity of disease agents and their control and eradication. The second group deals in more detail with the biologic and chemical characteristics of viruses, bacteria and helminths. Chapters 18 to 27 cover laboratory methods for growing and studying disease producing organisms. The chapters in group four cover the reaction of the host to invading organisms including resistance, immune response and hypersensitivity. Chapters 34 to 40 cover the preventive and public health aspects of control and prevention of disease. The final two groups deal with specific disease processes.

As organized, this text could serve as the basis for a general course covering briefly the fields of bacteriology, preventive medicine and public health for students in biology and nursing. Lacking references, the data would be of little stimulus to further inquiry by advanced students interested in more detail and original studies.

Progress in Fundamental Medicine

Edited by **J. F. A. McManus,** University of Virginia. Lea & Febiger, Philadelphia, 1952. 74 illustrations with 2 colored plates. 316 pp. with index. $9.

This is a multi-author work presented in a manner which emphasizes the close relationship between the clinical sciences and pathology. Each chapter is written by an authority in his field and the text is considerably more comprehensive than one usually expects to see in such a book. If more texts are needed in fundamental medicine, they should be of this variety. It is scholarly and should appeal to all students of medicine, regardless of their specialty.

Pharmacology in Clinical Practice

Harry Beckman, M.D., director, departments of pharmacology, Marquette University Schools of Medicine and Dentistry. W. B. Saunders Company, Philadelphia & London, 1952. Illustrated. 839 pp. with index. $12.50.

This text presents pharmacology as taught by a writer and teacher of many years experience and intensive clinical training. It is divided into sections including allergy, anesthesiology, cardiology, dentistry, dermatology, endocrinology, gastroenterology, internal medicine, neuropsychiatry, obstetrics and gynecology and all the surgical and related specialties. In addition there is a section devoted to a compendium of drugs similar to the classical presentation seen in many texts.

The writer has a refreshing viewpoint and presents the material with adequate illustrative charts and figures. It is to be expected where there are many choices of drugs, emphasis is placed on those that seem most valuable. At the same time those still employed or preferred by many because of long usage are not ignored.

The book is up to date and includes a liberal coverage of radioactive useful agents. In a field that is advancing so rapidly as chemotherapy it cannot be considered as a permanent reference but will be extremely useful to students of medicine in practically all categories and particularly to the general practitioner.

Textbook of General Surgery, 6th Edition

Warren H. Cole, M.D., F.A.C.S., professor and head of the department of surgery, University of Illinois College of Medicine, and **Robert Elman,** M.D., F.A.C.S., professor of clinical surgery, Washington University School of Medicine. Foreword by **Evarts A. Graham,** M.D., F.A.C.S. Appleton-Century-Crofts, Inc., New York, 1952. Illustrated. 1,154 pp. with index. $12.50.

This book has been a valuable textbook of general surgery for the past

16 years. The basic organization remains unchanged. Its primary purpose is the presentation in one comprehensive volume of the more important subjects requiring surgical consideration. It does not contain a detailed treatise on any subject and is not encumbered by lengthy descriptions of surgical technique.

The new edition brings the book into sharp focus on the many aspects of general surgery that are progressing so rapidly. The most radical changes from the previous text have been made in the chapters dealing with chemotherapy, vascular surgery, cardiac surgery and burns. Sections dealing with pre- and post-operative care and endocrinology have undergone extensive revisions.

The concise comprehensive nature of this volume makes it ideal for the medical student. The emphasis on physiology, pathology and pathogenesis is particularly valuable for members of the house staff who are developing a sound approach to treatment. The fundamental principles of surgery found throughout this volume make it a most valuable textbook for anyone who reads and reviews its pages.

Laboratory Technique in Biology and Medicine, 3rd Edition

E. V. Cowdry, research professor of anatomy, and director, Wernse Cancer Research Laboratory, Washington University, St. Louis. The Williams and Wilkins Company, Baltimore, 1952. 382 pp. $4.

The third edition of this book appearing so soon after the second is ample recognition of the rapid progress in this field. The same high standards that characterize previous editions are followed faithfully in the present volume. The new material is particularly valuable with respect to microscopy, histochemistry, chromatography and isotopic techniques. The book is a valuable compendium for any laboratory conducting advanced research.

Methods in Medical Research, Vol. 5

A. C. Corcoran, editor-in-chief. The Year Book Publishers, Inc., Chicago, 1952. Illustrated. 394 pp. with index. $7.50.

This volume continues the excellence of critical review of techniques which has characterized the series. Research workers interested in the study of substances of large molecular weight and the excretory or endocrine function of the kidney will find this volume of great value.

The Unipolar Electrocardiogram, a Clinical Interpretation

Joseph M. Barker, M.D., F.A.C.P., cardiologist, Yater Clinic, associate professor of clinical medicine and special lecturer in physiology, Georgetown University School of Medicine. Illustrated with charts and graphs. Appleton-Century-Crofts, Inc., New York, 1952. 655 pp. including index. $12.50.

Dr. Barker has undertaken the momentous task of presenting current knowledge of unipolar electrocardiography in this text. Several introductory volumes have appeared in recent years, but the bulk of the information on the subject has lain dormant in the tombs of scientific literature where it is accessible only to the advanced student of theoretical electrocardiography. It is this body of evidence that has brought electrocardiography out of the realm of empiricism and it is this material which Dr. Barker has presented in an easily understandable form.

The subject matter is well organized, clearly written and profusely illustrated with diagrams and example electrocardiograms. Of particular interest is the fact that the author stresses the basic mechanisms involved in the genesis of the electrocardiogram throughout, rather than the earlier empirical approach which required the student to memorize innumerable rules and patterns. Although this text is perhaps too extensive for the uninitiated, any serious student of electrocardiography will find it an invaluable reference.

Practical Clinical Chemistry

Nell F. Hollinger, Ph.D., assistant professor of laboratory practice, University of California, Berkeley; **Richard K. Lansing,** M.P.H.; **William J. Hayes,** M.P.H.; **Dorothy L. Chandler,** M.P.H. and **Elizabeth B. Austin,** M.P.H., all associates in public health, University of California, Berkeley. The National Press, Milbrae, Calif., 1952. In 3 parts. $4.50.

This work is written in three sections: 1. Principles, 2. Notes on Methods, 3. Solutions and Reagents, primarily as student aides.

The first section on principles is a pamphlet or syllabus of 77 pages with references summarized in outline form. The sections on notes on methods and solutions and reagents are on cards. All this material has been assembled from numerous textbooks and reference to the source is indicated. It is primarily

a student guide with all the pertinent material on clinical chemistry summarized in the briefest form. As such, it should be helpful to the student, but in no sense is it to be considered source material.

Health Resources in the United States—Personnel, Facilities and Services

George W. Bachman and associates of the Brookings Institution. The Brookings Institution, Washington, D. C., 1952. Numerous tables and graphs. 344 pp. including appendices and index. $5.

This report is another of a long series on studies of health problems made by the Brookings Institution since the early 1930's. The present study had as its objectives: "(1) to ascertain the extent of health resources available in the United States; (2) to describe the major private and public health programs, and (3) to furnish a basis for further study."

In the preface of the report Harold G. Moulton, president of the institution, states, "This study in itself is not intended to furnish a solution to health problems, but the assembling of existing information on health resources in a single volume provides a basic and convenient research tool for an appraisal of health services available to the American people."

Within the scope of these limited objectives, this study has succeeded very well. The reader will find in these pages a wealth of factual material which will be very useful to those interested in studying our health resources. However, he will find little or nothing with reference to an evaluation of these resources in terms of adequacy and in terms of what additional resources are needed. It is pleasing to note that research already is under way in the institution dealing with these important problems.

Rorschach's Test—III. Advances in Interpretation

Samuel J. Beck, Ph.D., Institute for Psychosomatic and Psychiatric Research, Michael Reese Hospital, Chicago. Grune & Stratton, New York, 1952. 301 pp. including index. $5.50.

Beck's earlier two volumes are supplemented by this study, which will be of greatest interest and usefulness to advanced students. In addition to the two chapters concerning advances in interpretation of the test and the Rorschach's relationship to personality, the case histories of four individuals are presented. Rorschach protocols and their interpretations and parallel clinical findings are reported in detail for each subject.

History of American Psychology

Dr. A. A. Roback, national research fellow in the biological sciences, fellow of the American Psychological Association. Library Publishers, New York, 1952. Illustrated with portraits. 426 pp. including index. $6.

This book has the distinction of being the first history of American psychology to be published. It traces in detail the development of psychology in this country from the time when it was closely allied with theology, through "the new psychology," the establishment of laboratories, the schools of psychology, to the present. It discusses the influence of European psychology on developments in this country as well as the particular contributions of American psychologists.

This book should be of most use to professors and graduate students as a supplemental text in the history of psychology.

The History of American Epidemiology

C.-E. A. Winslow, Dr. P.H., professor emeritus, Yale University School of Medicine; **Wilson G. Smillie,** M.D., professor of public health and preventive medicine, Cornell University Medical College; **James A. Doull,** M.D., medical director, Leonard Wood Memorial; **John E. Gordon,** M.D., professor of epidemiology, school of public health, Harvard University. Edited by **Franklin H. Top,** M.D., professor of epidemiology and pediatrics, College of Medical Science, University of Minnesota. The C. V. Mosby Company, St. Louis, 1952. 5 tables, 9 graphs, 190 pp. including indices. $4.75.

In the forward of this monograph, Dr. Top explains that at the 20th anniversary session of the epidemiological section of the American Public Health Association, held in New York, October 27, 1949, each of the four authors listed above presented a paper covering a historical era of American epidemiology. These papers were so enthusiastically received that publication of them was demanded. This volume thus includes, with some additional material, everything that was presented at that symposium.

In the first chapter Dr. Winslow discusses "The Colonial Era and the First Years of the Republic (1607-1799)." In

the second chapter Dr. Smillie discusses "The Period of Great Epidemics in the United States (1800-1875)," and illustrates a number of his points with tables and graphs. Under the title of "The Bacteriological Era (1876-1920)," Dr. Doull describes in Chapter 3 the impact of the discovery and the developing knowledge of bacteriology on the field of epidemiology. In Chapter 4 Dr. Gordon completes the symposium under the intriguing title of "The Twentieth Century—Yesterday, Today and Tomorrow (1920—)."

Each chapter is interestingly written and supplemented by numerous references to the literature. This is a volume which will be of interest to all American historians, public health officers, sanitarians, epidemiologists and public health statisticians.

Connective Tissues

Transactions of the third conference, February 14-15, 1952. Edited by **Charles Ragan**, department of medicine, College of Physicians and Surgeons, Columbia University. Sponsored by the Josiah Macy Jr. Foundation, New York, 1952. 166 pp. $3.50.

This informative study of current problems in this field should be of interest to every teaching and research histologist. It consists of four parts:

Connective Tissue Staining, by R. D. Lillie: this is a discussion of the staining reactions of collagen, reticulin and basement membranes with the Cajal, Van Gieson, Mallory and Masson trichrome techniques. The periodic acid staining results are discussed at length.

The Fine Structure of Connective Tissue, by Ralph W. G. Wyckoff: the author reports the results of electron microscopic studies of collagenous fibrils in teased loose connective tissue and tendon. Thickened transverse bands are noted at intervals of 650A and these often show subdivisions 210A apart. The significance of this periodicity is discussed.

The Nature of Reticulin, by A. H. T. Robb-Smith: this is a review of the reaction of reticulin to both the silver and the periodic-Schiff techniques. The relation of reticulin and collagen fibers is discussed. Some electron microscopic studies on reticulin indicate that these fibrils also show the characteristic 650A periodicity.

Hypersensitivity and the Hyperadrenal State, by Edward F. Fischel. This investigator questions the so-called "quantitative" studies that have been reported in the voluminous literature on allergy. He emphasizes that the amount of antibody involved in all reactions has a great deal to do with the severity of the reaction. He finds that the level of antibody production is depressed by the administration of cortisone and concludes that the tissues normally associated with antibody production have been disturbed morphologically by cortisone administration so that synthesis of antibody is inhibited. Injections of cortisone and ACTH do not prevent anaphylaxis. The latter part of this report is a stimulating discussion of biological problems that can and should be approached by the combined efforts of investigators trained in the research methods of chemistry, physics and histology.

Textbook of Gynecology, 4th Edition

Emil Novak, A.B., M.D., D.Sc. (Hon.), F.A.C.S., F.R.C.O.G. (Hon.), assistant professor emeritus of gynecology, The Johns Hopkins Medical School; **Edmund R. Novak**, A.B., M.D., F.A.C.S., instructor in gynecology, The Johns Hopkins Medical School. The Williams & Wilkins Company, Baltimore, 1952. Illustrated. 800 pp. with index. $9.

This compact volume, a discussion of all the basic subjects in gynecology, should be in the library of all medical students, general practitioners and students of gynecology. Chapters are arranged in a logical and orderly manner. An extensive bibliography will permit those who are interested to seek further current knowledge of a subject.

The authors' approach to the therapy of gynecological endocrine conditions with the steroid hormones is a most logical one. Their discussion of the menopause should be read by all who treat women of this age group. The controversial subject of the use of the vaginal pessary is well discussed.

The general surgeon or gynecologist who treats retrodisplacements of the uterus by any of the numerous surgical measures will benefit by studying the authors' philosophy concerning the symptoms of retroversion—surely many unnecessary operations would be avoided. The authors are frank in their criticisms of certain current vogues in abortion therapy and in the continued use

of older endocrine preparations that are proved inferior to the newer isolated compounds. They condemn those physicians who unjustifiably and promiscuously use estrogens, "who have not taken the trouble to learn even the elements of gynecological endocrinology."

Impromptu comments on various phases of gynecology and the conciseness of the chapters make this book a pleasure to read.

Human Embryology, 2nd Edition

W. J. Hamilton, M.D., D.Sc., professor of anatomy in the University of London at Charing Cross Hospital Medical School; **J. D. Boyd,** M.A., M.Sc., M.D., professor of anatomy in the University of Cambridge, and **H. W. Mossman,** M.S., Ph.D., associate professor of anatomy in the University of Wisconsin. The Williams & Wilkins Company, Baltimore, 1952. Illustrated, with color plates. 432 pp. with index. $9.

This is the second edition of an excellent text, originally published in 1945 and subsequently twice reprinted. This edition is considerably longer than the first due largely to the increase in the number of illustrations which are excellent, both in choice and from the standpoint of reproduction. The material has been drawn from advances in the field within the past two decades. The authors have successfully correlated the developmental history of the embryo with the physiological changes in the maternal organism.

The text is remarkably free of typographical errors. Although no substitute for serial sections of mammalian and human embryos are given, it does present probably the best aid now in existence. Recommended for all students of embryology.

Pictorial Handbook of Fracture Treatment, 3rd Edition

Edward L. Compere, M.D., F.A.C.S., associate professor of surgery, Northwestern University Medical School; **Sam W. Banks,** M.D., F.A.C.S., associate professor of surgery, Northwestern University Medical School; revised with assistance of **Clinton L. Compere,** M.D., F.A.C.S., assistant professor of surgery, Northwestern University Medical School. The Year Book Publishers, Inc., Chicago, 1952. Illustrated. 424 pp. with index. $6.50.

A third revision of a very practical handbook on fractures. The authors have succeeded in eliminating much controversial material and present in a straightforward way most of the information needed for treating the more common, noncomplicated fractures. As a handbook, much of the material has been condensed, but practically nothing of real value has been eliminated. Illustrations are excellent and the selection is good. This book will continue to be very useful for all those in the field, including the specialists.

An Introduction to Medical Science, 4th Edition

William Boyd, M.D., M.R.C.P., F.R.C.P., F.R.C.S., LL.D., F.R.S., professor of pathology, University of British Columbia. Lea & Febiger, Philadelphia, 1952. 124 illustrations and 3 color plates. 304 pp. with index. $4.50.

A brief review of pathology, primarily intended for nurses, physiotherapists, technicians or laymen interested in medicine.

Essentials of Dermatology, 4th Edition

Norman Tobias, M.D., associate clinical professor of dermatology, St. Louis University. J. B. Lippincott Company, Philadelphia, London, Montreal, 1952. 186 illustrations. 596 pp. with index. $6.

The fourth edition has been revised and most of the later advances in therapy, pathology and pathogenesis included. It is excellently produced and although not an exhaustive text, it is a very handy one, well organized and will continue to be of great use to general practitioners and medical students.

Synopsis of Obstetrics, 4th Edition

Jennings C. Litzenberg, B.Sc., M.D., F.A.C.S., late professor emeritus of obstetrics and gynecology, University of Minnesota Medical School. Revised by **Chas. E. McLennan,** M.D., professor of obstetrics and gynecology, Stanford University School of Medicine. The C. V. Mosby Company, St. Louis, 1952. With 157 illustrations, including 5 in color. 378 pp. with index. $5.50.

This is the fourth revision of a manual which was published over a decade ago as an aid to medical students, practitioners or others needing a brief account of obstetrics. The present edition has been revised to include the latest findings of importance and is recommended as a handy volume for this field.

Personal and Community Health, 9th Edition

C. E. Turner, D. Sc., Dr. P.H., professor of public health emeritus, Massachusetts Institute of Technology. The C. V. Mosby Company, St. Louis, 1952. Numerous illustrations. 659 pp. including appendix, glossary and index. $4.25.

This text for college students was first published by Dr. Turner in 1925.

It has undergone nine revisions and numerous reprintings and represents the results of many years of experience in teaching college students and students of public health, and engaging in the education of the public under the aegis of voluntary public health associations.

The first 20 chapters are devoted to matters of personal health, the last 10 to matters of community health. The author's effort throughout has been to "present the essential, present-day knowledge of personal and community health — with only enough anatomy, physiology and other underlying science to clarify and support the health teaching." In this effort he has been eminently successful. The text is authoritative and full of useful health information, and at the same time is readable and attractive. Contributing greatly to the attractiveness and readability are the numerous well-selected illustrations.

The Autonomic Nervous System, Anatomy, Physiology and Surgical Application, 3rd Edition

James C. White, M.D., associate professor of surgery, Harvard Medical School; **Reginald H. Smithwick,** M.D., professor and chairman of the department of surgery, Boston University School of Medicine; **Fiorindo A. Simeone,** M.D., professor of surgery, Western Reserve University School of Medicine. The Macmillan Company, New York, 1952. Illustrated. 569 pp. with index. $12.

The general plan of the third edition of the book is the same as the earlier edition, with a division into three parts. The first deals with the anatomy, physiology and pharmacology of the autonomic nervous system, the second with the role of sympathectomy as a method of treatment in visceral and vascular disorders and the third with surgical techniques. All three parts have been expanded to include further experience and newer knowledge.

In the section devoted to pharmacology for example, there is an excellent discussion of the recently developed clinical application of autonomic blocking agents such as the benzodioxanes, dibenamine, priscoline and the tetraethylammonium compounds. In the second part the most extensively enlarged section is that on sympathectomy in hypertension. Many new illustrations and charts have been added in all three parts and the quality of the reproduction of the old ones has been vastly improved.

Although the orientation is primarily one of surgical application, the succinct and accurate treatment of the complexities of autonomic anatomy and physiology and the excellent bibliography make this book useful to students, internists and neurologists as well as surgeons.

Zinsser's Textbook of Bacteriology, 10th Edition

David T. Smith, M.D., professor of bacteriology and associate professor of medicine; **Norman F. Conant,** M.D., professor of mycology and associate professor of bacteriology; **Joseph W. Beard,** M.D., professor of surgery in charge of experimental surgery; **Hilda Pope,** Ph. D., assistant professor of bacteriology; **D. Gordon Sharp,** Ph.D., assistant professor of biophysics in experimental surgery, and **Mary A. Foster,** M.A., instructor in bacteriology (all of Duke University School of Medicine). Appleton-Century-Crofts, Inc., New York, 1952. Illustrated. 1,012 pp. with index. $11.

The excellent reputation of this volume has been upheld in the current edition. There is a continuing emphasis on the basic approach to the behavior of pathogenic bacteria, with a great deal of attention being given to mechanisms of action. Although the approach is essentially basic, there has been no oversight of the necessity to make it a useful text of public health significance as well as of the practical clinical significance of the various organisms.

As a result of the multitudinous studies on antibiotics and the newer hormones, an enormous volume of literature has accumulated which concerns pathogenic bacteria. The pertinent data in this connection has been presented very ably.

Each chapter dealing with infection has an introductory paragraph which emphasizes the public health aspects of the diseases under discussion. A distinct improvement is the replacement by reference numbers of the names of authors from whom material is drawn. This facilitates reading considerably.

Gynecologic and Obstetric Pathology, 3rd Edition

Emil Novak, M.D., D. Sc., F.A.C.S., F.R.C.O.G., assistant professor emeritus of gynecology, John Hopkins Medical School. W. B. Saunders Company, Philadelphia and London, 1952. 630 illustrations, 19 in color. 595 pp. with index. $10.

The third edition carries forward the fine tradition of authoritative informa-

tion which has established this book as a classic on the subject of obstetric and gynecologic pathology. Although the general plan of the text remains relatively unchanged, the author has re-evaluated and recrystallized the more common lesions in the light of current literature, and has included concise discussions of the numerous rare lesions.

One of the invaluable features of the book has been the author's constant effort to correlate the clinical aspects with the pathological findings, especially as demonstrated by the expanded comprehensive discussion of carcinoma of the cervix, or ovarian tumors. In the individual sections a brief resume of the normal histological patterns has been provided as a preparatory foundation for the more complex pathological alterations. The author possesses the unusual faculty for presenting the prevalent theories and interpretations of etiology with the supporting evidence and with the interjection of his personal opinions and views without biased persuasion.

An entirely new section of the common breast lesions has been included.

Each chapter is well documented and provides a valuable list of the classical references on each particular condition. Many fine additional photomicrographs, which are typical of the lesion, enhance the extensively illustrated previous volume.

This edition has been designed as a guide to the gynecologist, and its comprehensive character renders it as a reference for the undergraduate and clinician. It constitutes a remarkable contribution and achievement which holds the respect and confidence of the medical profession.

Manual of Gynecology

E. Stewart Taylor, M.D. Lea & Febiger, Philadelphia, 1952. $4.50.

This manual, written for the medical student and general practitioner, covers all the more important phases of gynecology, devoting the most space to the more common disorders and their clinical management. Historical data, debatable theories and therapies have been deleted when possible so as not to leave the reader confused. In almost every instance, the most accepted view is stated. The conciseness of the manual and the author's ability to express himself clearly make this a valuable text for medical students when supplemented by classroom and clinical instructions. For added information on any subject, the student need only refer to the bibliography which is short, complete and carefully selected.

Synopsis of Genitourinary Diseases, 5th Edition

Austin I. Dodson, M.D., F.A.C.S., professor of genitourinary surgery, Medical College of Virginia; **Donald L. Gilbert,** M.D., instructor in urology, Medical College of Virginia. The C. V. Mosby Company, St. Louis, 1952. With 122 illustrations. 313 pp. including index. $4.

The new edition of this popular book has been brought up to date primarily in the field of antibiotics and chemotherapy. The organization and presentation of material is excellent and the illustrations adequate. The principles in the practice of urology are presented clearly. Although written primarily for students of medicine, this book will serve admirably as a reference for urological problems encountered in practice.

Pharmaceutical Calculations, 2nd Edition

Willis T. Bradley, A.B., A.M.; **Carroll B. Gustafson,** Ph.D., B.S., A.M., and **Mitchell J. Stoklosa,** Ph.C., B.S., A.M., of the faculty of the Massachusetts College of Pharmacy, Boston. Lea & Febiger, Philadelphia, 1952. 290 pp. $3.75.

The usefulness of this text to medical students would depend on the teaching of extemporaneous prescription writing. This teaching in medical schools today is not practiced as in previous years. A survey of the types of prescriptions written today indicates that only a very small percentage are compounded by the pharmacist and most of these are not extemporaneous. However, this book presents in a detailed and technical manner the problems that may confront the pharmacist. In this respect it could serve as a valuable reference book for pharmacists and pharmacy students.

Books and Pamphlets Received

(As space permits, those with the greatest interest to our readers will be reviewed)

The Treatment of the Young Delinquent

J. Arthur Hoyles. Philosophical Library, New York. 271 pp. with index. $4.75.

Medical Public Relations

A study of the public relations program of the Academy of Medicine of Toledo and Lucas County, Ohio, 1952. By **Edgar A. Schuler,** Ph.D., **Robert J. Mowitz,** Ph.D., **Albert J. Mayer,** Ph.D., all of the faculty of the college of liberal arts, Wayne University. Detroit, March 1953. 228 pp. with index.

Oral Anatomy, 2nd edition

Harry Sicher, M.D., D.Sc., professor of anatomy and histology, Loyola University School of Dentistry, Chicago College of Dental Surgery. The C. V. Mosby Company, St. Louis, 1952. 310 text illustrations, including 24 in color. 529 pp. with index. $13.50.

Aids to Osteology, 5th edition

Nils L. Eckhoff, M.S. (Lond.), F.R.C.S., surgeon, Guy's Hospital, etc. Bailliere, Tindall and Cox, London, 1952. Illustrated with drawings. 264 pp. with index. $2.

The Principles and Practice of Medicine

L. S. P. Davidson, B.A. Cantab., M.D., F.R.C.P. Ed., F.R.C.P. Lond., M.D. Oslo, physician to H. M. the Queen in Scotland and professor of medicine and clinical medicine, University of Edinburgh, with the staff of the department of medicine and associated clinical units. E. & S. Livingstone Ltd., Edinburgh & London, 1952. Illustrated. 919 pp. with index. $6.75.

Dermatology

Marion B. Sulzberger, M.D., professor and chairman, department of dermatology and syphilology, New York University Post-Graduate Medical School; **Jack Wolf,** M.D., associate professor of clinical dermatology and syphilology, New York University Post-Graduate Medical School. The Year Book Publishers, Inc., Chicago. 1952. Illustrated. 592 pp. with index. $10.

Metabolic Interrelations

With special reference to calcium. Transactions of the Fourth Conference, January 7-8, 1952. Edited by **Edward C. Reifenstein** Jr., M.D., director, Oklahoma Medical Research Institute and Hospital. Josiah Macy Jr. Foundation, New York, 1952. Illustrated. 262 pp. $4.50.

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Edited by **H. F. Moseley,** M.A., D.M., M.Ch. (Oxon), F.A.C.S., F.R.C.S. (Eng.), F.R.C.S. (C), assistant professor of surgery, McGill University. The C. V. Mosby Company, St. Louis, 1952. With 460 text illustrations and 46 color plates. 896 pp. with index. $15.

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Members of the staff of the Pennsylvania Hospital. Edited by **Clifford B. Lull,** M.D., late director, division of obstetrics and gynecology, and **Robert A. Kimbrough, M.D.,** director of the division of obstetrics and gynecology. J. B. Lippincott Company, Philadelphia, London, Montreal, 1953. 392 illustrations and 8 color plates. 732 pp. with index. $10.

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A Progress Report, 1948-1952, Graduate School of Public Health. University of Pittsburgh. 111 pp.

Occupational Licensing Legislation in the States. The Council of State Governments, 1313 East Sixtieth Street, Chicago 37. 106 pp.

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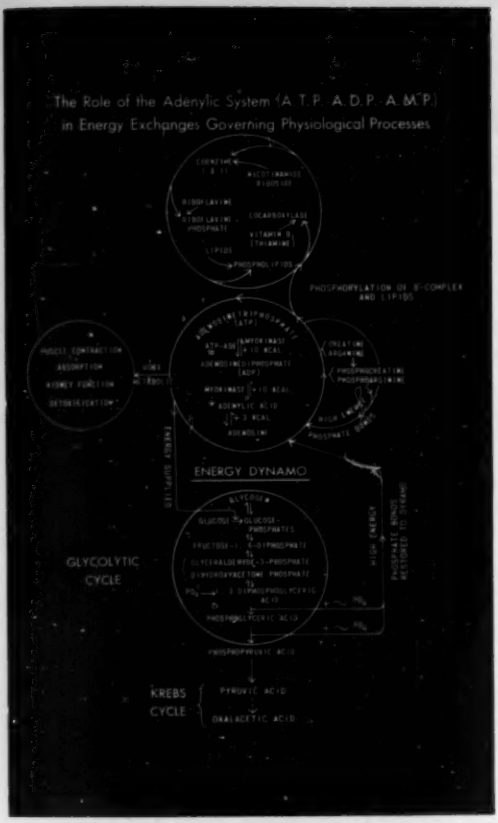
The Commonwealth Fund. 34th annual report for the year ending June 30, 1952. Harkness House, New York, 1952. 42 pp.

The Rockefeller Foundation. Annual report 1951. Illustrated. 557 pp. with index.

Chronicle of the World Health Organization, Vol. 6, No. 12. Medical aspects of social security, health and standards of living, anti-typhus campaign in Afghanistan, health education in upper Egypt. World Health Organization, Palais Des Nations, Geneva, 1952. May be obtained from the International Documents Service, Columbia University Press, New York 27. 28 pp. 75 cents.



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